

**AUSTRALIA**

*Patents Act 1990*

**IN THE MATTER OF** Australian Patent  
Application Serial No 696764 by Human  
Genome Sciences, Inc.

-and-

**IN THE MATTER OF** Opposition thereto by  
Ludwig Institute for Cancer Research

THIS IS Exhibit 1 referred to in the Statutory Declaration of Kari Alitalo made  
before me this 15<sup>th</sup> Day of February, 2000

OLLI-PEKKA SIRO  
~~Notary Public~~  
Notary Public



## CURRICULUM VITAE

Kari Kustaa Alitalo, born 21.05.52

### Position:

Research Professor, the Finnish Medical Research Council of the Finnish Academy of Sciences  
1.8.1993-31.7.2003

### Education:

Educational Commission for Foreign Medical Graduates (USA) - exam	1976
M.D. University of Helsinki	1977
M.Sc.D. (basic sciences, corresponding to Ph.D. degree)	
University of Helsinki	1980

### Previous professional appointments:

Research and teaching assistantships, Departments of Pathology, Virology, State Medical Research Council, The Finnish Academy of Sciences	1977-1982
Visiting Scientist, Department of Biochemistry, University of Washington, Seattle, USA (Dr. Paul Bornstein)	1981-1982
Visiting Scientist, Department of Microbiology and Immunology, University of California, San Francisco, USA (Dr. J. Michael Bishop and Dr. Harold E. Varmus)	1982-1983
Research Fellow, Senior RF, State Medical Research Council	1983-1986
Professor of Medical Biochemistry, University of Turku	12.1986-10.1987
Research Professor, The Finnish Cancer Institute	10.1987-07.1988
Professor of Cancer Biology, University of Helsinki	07.1988-07.1993
Professor of Medical Biochemistry, University of Helsinki	10.1996-
Research Professor, the Finnish Academy of Sciences	08.1993-

### Research awards and honours:

Primus Doctorum in the X Promotion of The Medical Faculty, University of Helsinki	1981
The Jahre Prize, Oslo, Norway	1987
Farmos Oy: Science Prize, Turku, Finland	1987
The Medix Prize for the Best Finnish Paper in the Biosciences in 1989	1990
The Finnish Medical Society Duodecim Äyräpää Prize	1998
The Medix Prize for the Best Finnish Paper in the Biosciences in 1997	1998
Europe Medecine Senior Prize	1999

### Editorial board memberships:

EMBO Journal	1994-1998 2000-
The FASEB Journal	
International Journal of Cancer	
British Journal of Cancer	

### Memberships in scientific societies:

European Molecular Biology Organization	1990-
Fund Committee	1994-1997

The Scientific Council, IARC/WHO	1991-1995
Nordic Molecular Biology Association (NOMBA)	1995-
Executive board	1990-1992
Scientific Evaluation group, International Cancer Technology Transfer-program (UICC)	
Finnish Association of Pathology	
Executive board	1985-1992
Chairman	1989-1991
Finnish Science Academy	
Finnish Cell Biology Association	
Societas Biochemica, Biophysica et Microbiologica Fennica	
American Society of Cell Biology	
American Association for Cancer Research	

#### **Mentor for doctoral training:**

1. Robert Winqvist: Chromosomal analysis of amplified oncogenes and *myc* protein, 1986.
2. Kalle Saksela: *myc* genes in human lung cancer: regulation and amplification, 1989.
3. Lea Sistonen: Regulation of gene expression by c-Ha-ras and *neu* oncoproteins, 1990.
4. Heikki Lehväslaiho: Functional analysis of the *neu* oncoprotein by recombinant DNA techniques, 1991.
5. Laura Lehtola: Analysis of the *neu* oncoprotein and other tyrosine kinases expressed in breast cancer cells, 1991.
6. Päivi Koskinen: Regulation and roles of c-myc and other growth factor-responsive genes, 1991.
7. Tomi Mäkelä: Studies on *myc* family and associated proteins: identification of the *rlf-L-myc* rearrangement, 1991.
8. Juha Partanen: Molecular cloning and characterization of novel tyrosine kinases expressed in K562 human leukemia cells, 1992.
9. Elina Armstrong: Analysis of chromosomal location and expression of novel leukemia cell receptor tyrosine kinase genes, 1993.
10. Harri Hirvonen: Of Myc and Men - expression of *MYC* proto-oncogenes in human fetal development, leukemias and brain tumors, 1993.
11. Liisa Pertovaara: Gene regulation by transforming growth factor- $\beta$  and inducers of tumor cell differentiation, 1994.
12. Jaana Korhonen: Characterization of endothelial receptor tyrosine kinases Tie and Flt4 in angiogenesis, 1995.
13. Katri Pajusola: Cloning and characterization of a new endothelial receptor tyrosine kinase Flt-4 and two novel VEGF-like growth factors VEGF-B and VEGF-C, 1996.
14. Imre Västrik: Max,  $\Delta$ Max and Mad1 as regulators of Myc proteins, 1996.
15. Satu Vainikka: Signal Transduction and expression of FGF receptor-4, 1996.
16. Erika Hatva: Receptor tyrosine kinases and growth factors in human brain tumors and vascular malformations, 1996.
17. Arja Kaipainen: Molecular control of lymphangiogenesis: Role of VEGF-C and its receptors, 1997.
18. Juha Klefström: Oncogenes as regulators of tumor necrosis factor induced cell death, 1997.
19. Petri Salven: Angiogenic molecules and cancer. Role of the vascular endothelial growth factor family, 1998.
20. Birgitta Olofsson: Studies of the vascular endothelial growth factors, VEGFs, and their receptors focusing on VEGF-B, 1999.
21. Athina Lymboussakis: Vascular endothelial growth factors and their receptors in embryos, adults and tumors, 1999.

### Invited speaker:

Recombinant DNA applications to defects in cellular functions and human diseases, 12.- 14.05.1985, Gentofte, *Denmark*  
Acta Endocrinologica Congress, 4.-10.08.1985, Helsinki, *Finland*  
EMBO Workshop on Oncogenes and Immortalization 4.-07.09.1985, Grignon, *France*  
Meeting of the Nordic Study Group on Cellular and Chemical Carcinogenesis, 14.-17.10.1985, Gl. Vrå, *Denmark*  
Maimonides Conference on Cancer Research, 1.-7.12.1985, Ein Gedi, *Israel*  
Chairman of the meeting "Role of Oncogenes in Human Cancer", 9.-10.01.1986, Helsinki, *Finland*  
European Tumor Virus Group Meeting, Chairman of the session "Cellular Oncogenes", 12.-19.04.1986, Le Normont, *France*  
Growth Factor Cascades: Mechanisms and opportunities for intervention, 15.-16.6.1986, Oslo, *Norway*  
Virus, Oncogenes et Cancer Humain, 21.4.1986, Villejuif, *France*  
IXV Annual Meeting of the International Society for Oncodevelopmental Biology and Medicine, 14.-17.08.1986, Helsinki, *Finland*  
Recombinant DNA in Clinical Medicine, 23.-26.8.1986, Hanasaari *Finland*  
First Conference on Differentiation Therapy 30.8.-3.9.1986, Capo Boi, *Italy*  
Cancer Prevention: Basic and Practical, 18.-19.10.1986, Hanasaari, *Finland*  
Growth Factors. Oncogenes and Cancer 22.-26.10.1986, Stockholm, *Sweden*  
EMBO Symposium on Oncogenes and Growth Control, 26.-30.4.1987, Heidelberg, *Germany*  
IX Meeting of the European Association for Cancer Research, 1.-3.6.1987, Helsinki, *Finland*  
Expression of Oncogenes and Regulation of Cell Growth, 5.-6.6.1987, Uppsala, *Sweden*  
Tumor Biology, Karolinska Institutet, 19.-20.8.1987, Stockholm, *Sweden*  
BACR Workshop on Oncogene Expression in Human Tumours 2.-4.9.1987, Cambridge, *UK*  
XII Berzelius Symposium: Growth Factors and Oncogenes – Structure, Function and Clinical Implications, 7.-8.9.1987, Sigtuna, *Sweden*  
Directions in Bioscience 11.-15.4.1988, Newark, *USA*  
XXI Nordiska Kongressen i Klinisk Kemi: Growth factors, oncogenes and cancer, 19.-22.6.1988, Kuopio, *Finland*  
European Tumor Virus Group Meeting, 30.4.-5.5.1989, Sundbyholm, *Sweden*  
Nordic Cancer Union Meeting, 17.-19.8.1989, Stockholm, *Sweden*  
EACR Oncogenes and Growth Control meeting 11.-12.9.1989, Galway, *Ireland*  
Molecular Basis of Human Cancer 13.-16.6.1990, Frederick, *USA*  
European Study Group on Cell Proliferation 13.9.1990, Espoo, *Finland*  
Oncogenes and Growth Control, The British Council 4.-7.6.1990, London, *England*  
Third European Congress on Cell Biology, 2.-5.9.1990, Firenze, *Italy*  
International Symposium on Angiogenesis, Chairman of the molecular biology session, 13.-15.3.1991, St. Gallen, *Switzerland*  
Scandinavian Breast Cancer Symposium 3.-5.6.1991, Haikko, *Finland*  
Sixth European Conference on Clinical Oncology and Cancer Nursing, 27.-31.10.1991, Firenze, *Italy*  
22nd Symposium of the Princess Takamatsu Cancer Research Fund, 19.-21.11.1991, Tokyo, *Japan*  
BACR Meeting on Growth Control and Cancer Therapy, 5.-7.12.1991, London, *UK*  
6th Congress of the European Society of Surgical Oncology, 10.-13.6.1992, Helsinki, *Finland*  
Growth Factor Receptors 15.-19.6.1992, Alpbach, *Austria*  
Molecular Basis of Human Cancer, 18.-21.6.1992, Frederick, *USA*  
Regulatory Peptides of the Fibroblast Growth Factor Family, 11.-16.10.1992, Roscoff, *France*

Mutant Oncogenes: Targets for Therapy 1992, 22-23.10.1992, London, *England*  
 Signalling mechanisms involved in control of cell growth, 3.-4.12.1992, London, *England*  
 8th International Symposium on Detection and Prevention of Human Cancer, 14.-18.3.1993, Nice, *France*  
 Phosphorylation/Dephosphorylation in Signal Transduction, 17.-24. 1.1993, Keystone, *USA*  
 XII Meeting of the European Association for Cancer Research, 4.-7.4.1993, Brussels, *Belgium*  
 European Congress on Biotechnology, 14.-16.6.1993, Firenze, *Italy*  
 The Molecular Basis of Cancer, 18.-20.6.1993, Frederick, *USA*  
 Ninth Annual Meeting on Oncogenes, 22.-26.6.1993, Frederick, *USA*  
 Growth Factors and Their Receptors, 16.-18.8.1993, Uppsala, *Sweden*  
 Cancer Symposium, 29.8-1.9.1993, Copenhagen, *Denmark*  
 Lympho-Hemopoiesis, 4.-7.9.1993, Ulm, *Germany*  
 Regulatory Molecules in Cell Proliferation, Cell Differentiation and Apoptosis, 10.-13.10.1993, Essen, *Germany*  
 Banbury Meeting on Mechanisms of Developmental and Tumor Angiogenesis, 7.-10.11.1993, Cold Spring Harbor, *USA*  
 Interactions of Cancer Susceptibility Genes and Environmental Carcinogens, 9.-13.11.1993, Lyon, *France*  
 Molecular Pathobiology of Cancer, 11-15 4.1994, Dalfsen, *The Netherlands*  
 Molecular and Cellular Aspects of FGFs and their Receptors, 29.5.-02.6.1994, Capri, *Italy*  
 FEBS Special Meeting on Biological Membranes, 26.6.-1.7.1994, Helsinki, *Finland*  
 Regulation of Hematopoietic Stem Cells, 18.-20.12.1994, Osaka, *Japan*  
 Human Hematopoietic Stem Cell Meeting, 31.3.-2.4.1995, Vienna, *Austria*  
 Cytoplasmic Protein-Tyrosine Kinases, 12.-14.5.1995, Stockholm, *Sweden*  
 Chairman of the EMBO Workshop on Growth Factors and Receptor Kinases, 26.-28.5.1995, Helsinki, *Finland*  
 The Frontiers of Contemporary Science, 5.-7.6.1995, Kuopio, *Finland*  
 23rd Meeting of the Federation of European Biochemical Societies, 13.-18.8.1995, Basel, *Switzerland*  
 International Society of Experimental Hematology, 27.-31.8.1995, Düsseldorf, *Germany*  
 Tumor angiogenesis and anti-angiogenesis, 1.-5.11.1995, Titisee, *Germany*  
 Keystone symposium on Signal Transduction through Tyrosine Kinases, 27.3.-2.4.1996, Taos, *USA*  
 Vascular Endothelium and Regulation of Leukocyte Traffic, 20-22.5.1996, Madrid, *Spain*  
 EMBO Practical Course on Growth and Differentiation Factors, 27.7.1996, Birmingham, *England*  
 Fourth International Workshop on Targeted Cancer Therapy, 21.-23.8.1996, Bethesda, Maryland, *USA*  
 Symposium on Vascular Remodeling, 14.9.1996, Tokyo, *Japan*  
 IX International Vascular Biology Meeting, 4.-8.9.1996, Seattle, *USA*  
 First Haartman Symposium on Cell Differentiation, 19.-21.9.1996 Helsinki, *Finland*  
 Development, Cell Differentiation and Cancer, 28.9.-2.10.1996, Pisa, *Italy*  
 The Role of Cytokines in Human Disease, 17.-20.11.1996, Tegernsee, *Germany*  
 AACR Conference on Cell Signalling and Cancer Treatment, 23.-28.2.1997, Telfs-Buchen, *Austria*  
 A lecturer of the Program of Ten-Year Cancer Control, 29.3.-6.4.1997, Tokyo, Kanazawa, Kumamoto, *Japan*  
 Gordon Conference on Angiogenesis and Microcirculation, 17.-22.8.1997, New Hampshire, *USA*  
 Wenner-Gren Symposium on Protein Phosphorylation, 4.-6.9.1997, Stockholm, *Sweden*  
 Cell Signaling and Tumor Angiogenesis, 9.-14.9.1997, Lake Placid, *USA*  
 The European Cancer Conference, 14.-18.9.1997, Hamburg, *Germany*  
 Philippe Laudat Conference, 21.-25.9.1997, Paris, *France*  
 Molecular Determinants of Cancer Metastasis, 28.-31.10.1997, Houston, *USA*  
 The Endothelial Cell, 14.11.1997, Paris, *France*  
 American Society of Hematology Annual Meeting, 3.-11.12.1998, San Diego, *USA*

Angiogenesis and Cancer, 24.-28.1.1998, Orlando, *USA*  
 Signal Transduction and Angiogenesis, 5.-8.2.1998, Paris, *France*  
 Ovarian Cancer - Basic Science and Modern Treatment, 20.3.1998, Tampere, *Finland*  
 Vascular Biology of Complications in Diabetes, 5.4.1998, Stockholm, *Sweden*  
 IBC/Angiogenesis Meeting 24.4.1998, Boston, *USA*  
 Angiogenesis Meeting, 27.5.1998, London, *England*  
 MDC Symposium, 6th Symposium on Gene Therapy, 4.-6.5.1998, Berlin-Buch, *Germany*  
 Vascular Complications in Diabetes, 30.4.1998, Stockholm, *Sweden*  
 EFES 2nd Postgraduate Course in Molecular and Cellular Endocrinology, 8.6.1998, Turku, *Finland*  
 Laboratory Medicine 98, XXVI Nordic Congress of Clinical Chemistry, 8.6.1998, Turku, *Finland*  
 Silver Jubilee FEBS Meeting, 5.-10.7.1998, Copenhagen, *Denmark*  
 Vascular Biology Conference 98, 24.-25.7.1998, Ohtsu, *Japan*  
 Gordon Research Conference on Peptide Growth Factors, 9.-14.8.1998, New Hampshire, *USA*  
 Xth International Vascular Biology Meeting, 23.-27.8.1998, Cairns, *Australia*  
 5th Franz-Volhard-Symposium, 3.-4.9.1998, Gross Dölln, *Germany*  
 First International Symposium on GIST, 25.-26.9.1998, Helsinki, *Finland*  
 10th Conference of the International Society of Differentiation, 3.-7.10.1998, Houston, *USA*  
 29th International Symposium of the Princess Takamatsu Cancer Research Fund, 17.-19.11.1998, Tokyo, *Japan*  
 Novel tools and methodologies to promote or inhibit angiogenesis for drug development, 3.-4.12.1998, London, *England*  
 Role vascular endothelial growth factors in normal and pathological blood vessel formation, 18.-20.12.1998, Siena, *Italy*  
 UK Molecular Biology and Cancer Network meeting 15, 14.-16.12.1998, Warwick, *England*  
 NOVO Nordisk Ceremony, 24.-25.1.1999, Copenhagen, *Denmark*  
 ESF/EMRC Workshop on Proteome Analysis in Medical Research, 5.-7.2.1999, Chamonix, *France*  
 Annual Meeting of the Center for Molecular medicine (ZMMK), Signal Transduction and Disease, 13.-14.3.1999, Cologne, *Germany*  
 Danish Association for Cancer Research, Annual Meeting, 22-23.4.1999, Copenhagen, *Denmark*  
 International Titisee Conference, Parallels in cancer and embryonic development, 29.4.-2.5.1999, Titisee-Neustadt, *Germany*  
 EVBA meeting, Endothelial Cell Activation: Inflammation and Angiogenesis, 15.-16.5.1999, Baden, *Austria*  
 Ludwig Institute for Cancer Research, Angiogenesis meeting, 7.6.1999, Helsinki, *Finland*  
 European Developmental Biology Congress-99, 19-23.6.1999, Oslo, *Norway*  
 UICC Conference on Cell Signaling and Cancer, 5.-8.8.1999, Tammsvik, *Sweden*  
 Gordon Conference on Angiogenesis and Microcirculation, Salve Regina University, 14.-21.8.1999, Newport, *USA*  
 VII Danish Cancer Society Symposium, 24.8.1999, Copenhagen, *Denmark*  
 The IXth Annual BioCity Symposium, From Receptor Activation to Gene Expression, 26.-27.8.1999, Turku, *Finland*  
 MMGM, Mouse Molecular Genetics Meeting, 4.9.1999, Heidelberg, *Germany*  
 European Meeting on Vascular Biology and Medicine, 29.-30.9.1999, Nürnberg, *Germany*  
 EMBO Workshop on Stem Cells, Growth Factors and Cancer, 7.-10.10.1999, Torino, *Italy*  
 IIGB Workshop on Vasculogenesis and Angiogenesis, 9.-12.10.1999, Capri, *Italy*  
 ESH Conference on Angiogenesis and Tumours, 22.-25.10.1999, Paris, *France*  
 International Society for Oncodevelopmental Biology and Medicine, 31.10.-4.11.1999, Kyoto, *Japan*  
 ASN Basic Science Conference, 2.-4.11.1999, Miami, *USA*  
 Workshop on Lymphoid Organogenesis, 5.11.1999, Basel, *Switzerland*  
 Biological basis for antiangiogenic therapy, 7.-10.11.1999, Milan, *Italy*

Angiogenesis Workshop, 11.11.1999, Basel, *Switzerland*

Nordic.Symposium of Radiation Oncology, 22.-24.11.1999, Tampere, *Finland*

**Opponent of doctoral dissertations:**

Dr. Zvi Wirschubsky, Karolinska Institutet, Stockholm, Sweden, 1986

Dr. Sigurdur Ingvarsson, Karolinska Institutet, Stockholm, Sweden, 1989

Dr. Arne Östman, University of Uppsala, Uppsala, Sweden, 1990

Dr. Klaus Elenius, University of Turku, Turku, Finland, 1992

Dr. Berthe Willumsen, University of Copenhagen, Copenhagen, Denmark, 1993

PUBLICATIONS:

1. Alitalo, K., Paavolainen, P., Franssila, K. and Ritsilä, V.: Clear-cell sarcoma of tendons and aponeuroses. *Acta Orthoped. Scand.* 48: 241-244, 1977.
2. Hedman, K., Kurkinen, M., Alitalo, K., Vaheri, A., Johansson, S. and Höök, M.: Isolation of the pericellular matrix of human fibroblast cultures. *J. Cell Biol.* 81: 83-91, 1979.
3. Kurkinen, M., Alitalo, K., Vaheri, A., Stenman, S. and Saxen, L.: Fibronectin in the development of embryonic chick eye. *Devel. Biol.* 69: 589-600, 1979.
4. Kurkinen, M. and Alitalo, K.: Fibronectin and procollagen produced by a clonal line of Schwann cells. *FEBS Lett.* 102: 64-68, 1979.
5. Krieg, T., Timpl, R., Alitalo, K., Kurkinen, M. and Vaheri, A.: Type III procollagen is the major collagenous component produced by a continuous rhabdomyosarcoma cell line. *FEBS Lett.* 104: 405-409, 1979.
6. Ekblom, P., Alitalo, K., Vaheri, A., Timpl, R. and Saxen, L.: Induction of a basement membrane glycoprotein in embryonic kidney; possible role of laminin in morphogenesis. *Proc. Natl. Acad. Sci. USA* 77: 485-489, 1980.
7. Alitalo, K., Kurkinen, M., Vaheri, A., Krieg, T. and Timpl, R.: Extracellular matrix components synthesized by human amniotic epithelial cells in culture. *Cell* 19: 1053-1062, 1980.
8. Alitalo, K., Hovi, T. and Vaheri, A.: Fibronectin is produced by human macrophages. *J. Exp. Med.* 151: 602-613, 1980.
9. Alitalo, K.: Production of both interstitial and basement membrane procollagens by fibroblastic WI-38 cells from human embryonic lung. *Biochem. Biophys. Res. Commun.* 93: 873-880, 1980.
10. Alitalo, K., Vaheri, A., Krieg, T. and Timpl, R.: Biosynthesis of two subunits of type IV procollagen and of other basement membrane proteins by a human tumor cell line. *Eur. J. Biochem.* 109: 247-255, 1980.
11. Alitalo, K., Kurkinen, M., Vaheri, A., Virtanen, I., Rohde, H. and Timpl, R.: Basal lamina glycoproteins are produced by neuroblastoma cells. *Nature* 287: 465-466, 1980.
12. Saksela, O., Alitalo, K., Kiistala, U. and Vaheri, A.: Basal lamina components in experimentally induced skin blisters. *J. Invest. Dermatol.* 77: 283-286, 1981.
13. Myllylä, R., Alitalo, K., Vaheri, A. and Kivirikko, K.I.: Regulation of post-translational modification of collagen in transformed human and chick-embryo cells. *Biochem. J.* 196: 683-692, 1981.
14. Alitalo, K., Keski-Oja, J. and Vaheri, A.: Extracellular matrix proteins characterize human tumor cell lines. *Int. J. Cancer* 27: 7545-761, 1981.
15. Pihlajaniemi, T., Myllylä, R., Alitalo, K., Vaheri, A. and Kivirikko, K.I.: Posttranslational modifications in the biosynthesis of collagen type IV by a human tumor cell line. *Biochemistry* 20: 7409-7415, 1981.
16. Leivo, I., Alitalo, K., Risteli, L., Vaheri, A., Timpl, R. and Wartiovaara, J.: Basal lamina glycoproteins laminin and type IV collagen are assembled into a fine-fibered matrix in cultures of a teratocarcinoma-derived cell line. *Exp. Cell Res.* 137: 15-23, 1982.
17. Alitalo, K., Kuismanen, E., Myllylä, R., Kiistala, U., Asko-Seljavaara, S. and Vaheri, A.: Extracellular matrix proteins of human epidermal keratinocytes and feeder 3T3 cells. *J. Cell Biol.* 94: 947-505, 1982.
18. Alitalo, K., Kurkinen, M., Virtanen, I., Mellström, K. and Vaheri, A.: Deposition of basement membrane proteins in attachment and neurite formation of cultured murine C-1300 neuroblastoma cells. *J. Cell. Biochem.* 18: 25-35, 1982.
19. Alitalo, K., Halila, H., Vesterinen, E. and Vaheri, A.: Endo- and ecto-cervical human uterine epithelial cells distinguished by fibronectin production and keratinization in culture. *Cancer Res.* 42: 1142-1146, 1982.
20. Hedman, K., Alitalo, K., Vaheri, A. and Timpl, R.: Deposition of an intermediate form of procollagen type III (pN-collagen) into fibrils in



the matrix of amniotic epithelial cells. *EMBO J.* 1: 47-52, 1982.

21. Keski-Oja, J., Gahmberg, C.G. and Alitalo, K.: Pericellular matrix and cell surface glycoproteins of virus-transformed mouse epithelial cells. *Cancer Res.* 42: 1147-1153, 1982.

22. Alitalo, K., Keski-Oja, J., Hedman, K. and Vaheri, A.: Loss of different pericellular matrix components of rat cells transformed by a T-class ts-mutant of Rous sarcoma virus. *Virology* 119: 347-357, 1982.

23. Majamaa, K., Myllylä, R., Alitalo, K. and Vaheri, A.: Regulation of proline 3-hydroxylation and prolyl 3-hydroxylase and 4-hydroxylase activities in transformed cells. *Biochem. J.* 206: 499-503, 1982.

24. Alitalo, K., Myllylä, R., Sage, H., Pritzl, P., Vaheri, A. and Bornstein, P.: Biosynthesis of type V collagen by A204, a human rhabdomyosarcoma cell line. *J. Biol. Chem.* 257: 9016-9024, 1982.

25. Alitalo, K., Bornstein, P., Vaheri, A. and Sage, H.: Biosynthesis of an unusual collagen type by human astrocytoma cells *in vitro*. *J. Biol. Chem.* 258: 2653-2661, 1983.

26. Sovova, V., Travnicek, M., Hlozaneck, I., Cerna, H., Alitalo, K. and Vaheri, A.: Evidence for p15 cleavage site in *myc*-specific proteins of avian MC29 and OK10 viruses. *J. Cell. Biochem.* 28: 265-272, 1983.

27. Alitalo, K., Keski-Oja, J. and Bornstein, P.: Effects of Zn<sup>2+</sup> ions on protein phosphorylation in epithelial cell membranes. *J. Cell. Physiol.* 115: 305-312, 1983.

28. Courtneidge, S., Ralston, R., Alitalo, K. and Bishop, J.M.: Subcellular location of an abundant substrate (p36) for tyrosine-specific protein kinases. *Mol. Cell. Biol.* 3: 340-350, 1983.

29. Alitalo, K., Bishop, J.M., Smith, D.H., Chen, E.Y., Colby, W.W. and Levinson, A.D.: Nucleotide sequence of the *v-myc* oncogene of avian retrovirus MC29. *Proc. Natl. Acad. Sci. USA*, 80: 100-104, 1983.

30. Alitalo, K., Schwab, M., Lin, C.C., Varmus, H. and Bishop, J.M.: Homogeneously staining chromosomal regions contain amplified copies of an abundantly expressed cellular oncogene (*c-myc*) in malignant neuroendocrine cells from a human colon carcinoma. *Proc. Natl. Acad. Sci. USA*, 80: 1707-1711, 1983.

31. Schwab, M., Alitalo, K., Varmus, H., Bishop, J.M. and George, D.: A cellular oncogene (*c-Ki-ras*) is amplified, overexpressed and located within karyotypic abnormalities in mouse adrenocortical tumour cells. *Nature* 303: 497-501, 1983.

32. Alitalo, K., Ramsay, G.M., and Bishop, J., Pfeifer-Ohlsson, S., Colby, W.W. and Levinson, A.D.: Identification of nuclear proteins encoded by viral and cellular *myc*-oncogenes. *Nature* 306: 274-277, 1983.

33. Schwab, M., Alitalo, K., Klempnauer, K.-H., Gilbert, F., Brodeur, G., Trent, J.T., Varmus, H.E. and Bishop, J.M.: Amplified DNA with limited homology to *myc* cellular oncogene is shared by human neuroblastoma cell lines and a neuroblastoma tumour. *Nature* 305: 245-248, 1983.

34. Alitalo, K., Winqvist, R., Lin, C.C., de la Chapelle, A., Schwab, M. and Bishop, J.M.: Aberrant expression of an amplified *c-myb* oncogene in two cell lines from a colon carcinoma. *Proc. Natl. Acad. Sci. USA*, 81: 4534-4538, 1984.

35. Lehto, V.-P., Virtanen, I., Ralston, R., Paasivuo, R. and Alitalo, K.: The p36 substrate of tyrosine-specific protein kinases co-localizes with non-erythrocyte alpha-spectrin antigen, p230, in surface lamina of cultured fibroblasts. *EMBO J.* 2: 1701-1705, 1983.

36. Winqvist, R., Saksela, K. and Alitalo, K.: *myc*-proteins are not associated with chromatin in mitotic cells. *EMBO J.* 3: 2947-2950, 1984.

37. Keski-Oja, J., Alitalo, K., Hautanen, A. and Rapp, U.R.: Transformation of cultured epithelial cells by ethylnitrosourea: altered expression of type I procollagen chains. *Biochem. Biophys. Acta* 803: 153-162, 1984.

38. Alitalo, K., Ralston, R.R. and Keski-Oja, J.: Distribution of the 36 000 dalton tyrosine protein kinase substrate in drug- and epidermal growth factor-treated epithelial cells. *Exp. Cell Res.* 150: 177-186, 1984.

39. Lin, C.C., Alitalo, K., Schwab, M., George, D., Varmus, H.E. and Bishop, M.: Evolution of karyotypic abnormalities and *c-myc* oncogene amplification in a human colonic carcinoma. *Chromosoma* 92: 11-15, 1985.
40. Saksela, K., Bergh, J., Lehto, V-P., Nilsson, K. and Alitalo, K.: Amplification of the *c-myc* oncogene is characteristic of a subpopulation of human small cell lung cancer. *Cancer Res.* 45: 1823-1827, 1985.
41. Winqvist, R., Knuutila, S., Leprince, D., Stehelin, D. and Alitalo, K.: Mapping of amplified *c-myb* oncogene, sister chromatid exchanges and karyotypic analysis of the COLO 205 colon carcinoma cell line. *Cancer Genet. Cytogenet.* 18: 251-264, 1985.
42. Pohjanpelto, P., Hölttä, E., Jänne, O., Knuutila, S. and Alitalo, K.: Amplification of ornithine decarboxylase gene in response to polyamine starvation in CHO cells. *J. Biol. Chem.* 260: 8532-8537, 1985.
43. Alitalo, K., Saksela, K., Winqvist, R., Laiho, M., Keski-Oja, J., Alitalo, R., Ilvonen, M., Knuutila, S., and de la Chapelle, A.: Acute myelogenous leukemia with *c-myc* amplification and double minute chromosomes. *The Lancet II*: 1035-1038, 1985.
44. Keski-Oja, J. and Alitalo, K.: Reorganization of plasma membrane-associated 36 000 dalton protein upon drug-induced redistribution of cytokeratin. *Exp. Cell. Res.* 158: 86-95, 1985.
45. Schwab, M., Ramsay, G., Alitalo, K., Varmus, H.E., Bishop, J.M., Martinsson, T., Levan, G. and Levan A.: Amplification and enhanced expression of the *c-myc* gene in mouse SEWA cells. *Nature* 315: 345-347, 1985.
46. Schwab, M., Klempnauer, K.-H., Alitalo, K., Varmus, H. and Bishop, J.M.: Rearrangement at the 5' end of amplified *c-myc* in human COLO320 cells is associated with abnormal transcription. *Mol. Cell. Biol.* 6: 2752-2755, 1986.
47. Winqvist, R., Mäkelä, T.P., Seppänen, P., Jänne, O.A., Alhonen-Hongisto, L., Jänne, J., Grzeschik, K.-H. and Alitalo, K.: Human ornithine decarboxylase sequences map to chromosome regions 2pter - p23 and 7cen - qter but are not coamplified with the *N-myc* oncogene. *Cytogenet. Cell Genet.* 42: 133-140, 1986.
48. Alhonen-Hongisto, L., Leinonen, P., Sinervirta, R., Laine, R., Winqvist, R., Alitalo, K., Jänne, O.A. and Jänne, J.: Mouse and human ornithine decarboxylase genes: Methylation polymorphism and amplification. *Biochem. J.* 242: 205-210, 1987.
49. Sistonen, L., Keski-Oja, K., Ulmanen, I., Hölttä, E., Wikgren, B.-J. and Alitalo, K.: Dose effects of transfected *c-Ha-ras* (Val 12) oncogene in transformed cell clones. *Exp. Cell Res.* 168: 518-530, 1987.
50. Klinger, K.W., Winqvist, R., Riccio, A., Andreasen, P.A., Sartorio, R., Nielsen, L.S., Stuart, P., Stanislovits, P., Watkins, P., Douglas, R., Grzeschik, K.-H., Alitalo, K., Blasi, F. and Danø, K.: Plasminogen activator inhibitor type 1 gene is located at region q21.3-q22 of chromosome 7 and genetically linked with cystic fibrosis. *Proc. Natl. Acad. Sci. USA* 84: 8548-8552, 1987.
51. Alitalo, R., Andersson, L., Betsholtz, C., Nilsson, K., Westermark, B., Heldin, C.-H. and Alitalo, K.: Induction of platelet-derived growth factor gene expression during megakaryoblastic and monocytic differentiation of human leukemia cell lines. *EMBO J.* 6: 1213-1218, 1987.
52. Mäkelä, T.P., Alitalo, R., Paulsson, Y., Westermark, B., Heldin, C.-H. and Alitalo, K.: Regulation of platelet derived growth factor gene expression by transforming growth factor- $\beta$  and phorbol ester in human leukemia cell lines. *Mol. Cell. Biol.* 7: 3656-3662, 1987.
53. Sandberg, M., Vuorio, T., Hirvonen, H., Alitalo, K. and Vuorio, E.: Enhanced expression of TGF $\beta$  and *c-fos* mRNAs in the growth plates of developing human long bones. *Development* 102: 461-470, 1988.
54. Vuorio, T., Rajamäki, A., Sandberg, M., Alitalo, K. and Vuorio, E.: Expression of the *c-Ha-ras* oncogene in DMBA-induced, antiestrogen-treated rat mammary tumors. *Int. J. Cancer* 42: 774-779, 1988.
55. Alitalo, R., Mäkelä, T.P., Andersson, L.C. and Alitalo, K.: Enhanced expression of transforming growth factor  $\beta$  RNA:s during megakaryoblastic differentiation of K562 leukemia cells. *Blood* 71: 899-906, 1988.
56. Hölttä, E., Sistonen, L. and Alitalo, K.: The mechanisms of ornithine decarboxylase deregulation in *c-Ha-ras*-oncogene-transformed NIH 3T3 cells. *J. Biol. Chem.* 263: 4500-4507, 1988.
57. Legraverend, C., Potter, A., Hölttä, E., Alitalo, K. and Anderson, L.: Interleukin-2 regulates the expression of ornithine decarboxylase

in a cloned murine T lymphocytic cell line. *Exp. Cell Res.* 181: 273-281, 1989.

58. Hurme, M., Sihvola, M., Alitalo, K. and Keski-Oja, J.: Transforming growth factor  $\beta$  does not alter interleukin-1 expression in cultured human macrophages. *J. Cell. Biochem.* 39: 467-475, 1989.

59. Sihvola, M., Sistonen, L., Alitalo, K. and Hurme, M.: Mechanism of T-cell proliferation *in vivo*: analysis of IL-2 receptor expression and activation of *c-myc* and *c-myb* oncogenes during lymphatic regeneration. *Biochem. Biophys. Res. Commun.* 160: 181-188, 1989.

60. Hirvonen, H., Sandberg, M., Kalimo, H., Hukkanen, V., Vuorio, E. and Alitalo, K.: The N-myc proto-oncogene and IGF-II growth factor mRNA:s are expressed by distinct cells in human fetal kidney and brain. *J. Cell Biol.* 108: 1093-1104, 1989.

61. Sistonen, L., Hölttä, E., Mäkelä, T. P., Keski-Oja, J. and Alitalo, K.: The cellular response to induction of the p21c-Ha-ras oncoprotein includes stimulation of *jun* gene expression. *EMBO J.* 8: 815-822, 1989.

62. Bianchi, N.O., Bianchi, M.S., Alitalo, K. and de la Chapelle, A.: The methylation pattern of normal and truncated amplified human *c-myc* oncogenes. *Biochem. Biophys. Acta* 1007: 350-355, 1989.

63. Saksela, K., Mäkelä, T. P., Evan, G. and Alitalo, K.: A rapid change in L-myc protein phosphorylation induced by phorbol ester tumor promoters and serum. *EMBO J.* 8: 149-157, 1989.

64. Sistonen L., Lehväslaiho H., Lehtola L., Hölttä E. and Alitalo K.: Activation of a chimeric EGF-R/neu tyrosine kinase induces the *fos/jun* transcription factor complex, glucose transporter and ornithine decarboxylase. *J. Cell Biol.* 109: 1911-1919, 1989.

65. Pandiella, A., Lehväslaiho, H., Magni, M., Alitalo, K. and Meldolesi, J.: Activation of an EGFR/neu chimeric receptor: intracellular signals and cell proliferation responses. *Oncogene* 4: 1299-1305, 1989.

66. Lehväslaiho H., Lehtola L., Sistonen L. and Alitalo K.: A chimeric EGF-R/neu proto-oncogene allows EGF to regulate neu tyrosine kinase and cell transformation. *EMBO J.* 8: 159-166, 1989.

67. Pertovaara L., Sistonen L., Bos T., Vogt P., Keski-Oja J. and Alitalo, K.: Enhanced *jun* gene expression is an early genomic response to transforming growth factor- $\beta$  stimulation. *Mol. Cell. Biol.* 9: 1255-1262, 1989.

68. Mäkelä, T.P., Saksela, K. and Alitalo, K.: Two N-myc polypeptides with distinct amino termini encoded by the second and third exons of the gene. *Mol. Cell. Biol.* 9: 1545-1552, 1989.

69. Lehtola, L., Lehväslaiho, H., Sistonen, L., Beguinot, L. and Alitalo, K.: Receptor downregulation and DNA synthesis are modulated by EGF and TPA in cells expressing an EGFR/neu chimera. *Growth Factors* 1: 323-334, 1989.

70. Saksela, K., Mäkelä, T.P. and Alitalo, K.: Oncogene expression in small cell lung cancer cell lines and a testicular germ-cell tumor: Activation of the N-myc gene and decreased RB mRNA. *Int. J. Cancer* 44: 182-185, 1989.

71. Bianchi, N.O., Bianchi, M.S., López-Larraz, D., Alitalo, K. and de la Chapelle, A.: Damage and repair induced by bleomycin in the domain of human amplified *myc* oncogenes. *Cancer Res.* 50: 2379-2384, 1990.

72. Lehväslaiho, H., Sistonen, L., diRenzo, F., Partanen, J., Comoglio, P., Hölttä, E. and Alitalo, K.: Regulation by EGF is maintained in an overexpressed chimeric EGFR/neu tyrosine kinase. *J. Cell. Biochem.* 42: 123-133, 1990.

73. Sistonen L., Koskinen P., Lehväslaiho H., Lehtola L., Bravo R. and Alitalo K.: Downregulation of the early genomic growth factor response in neu oncogene-transformed cells. *Oncogene* 5: 815-821, 1990.

74. Koskinen, P., Lehväslaiho, H., MacDonald-Bravo, H., Alitalo, K. and Bravo, R.: Similar early gene responses to ligand-activated EGFR and neu tyrosine kinases in NIH 3T3 cells. *Oncogene* 5: 615-618, 1990.

75. Laitinen, J., Sistonen, L., Alitalo, K. and Hölttä, E.: c-Ha-ras<sup>Val12</sup> oncogene-transformed NIH-3T3 fibroblasts display more decondensed nucleosomal organization than normal fibroblasts. *J. Cell Biol.* 111: 9-17, 1990.

76. Alitalo, R., Partanen, J., Pertovaara, L., Hölttä, E., Sistonen, L., Andersson, L. and Alitalo, K.: Increased erythroid potentiating activity/tissue inhibitor of metalloproteinases and *jun/fos* transcription factor complex characterize tumor promoter-induced

megakaryoblastic differentiation of K562 leukemia cells. *Blood* 75: 1974-1982, 1990.

77. Hirvonen, H., Mäkelä, T., Sandberg, M., Kalimo, H., Vuorio, E. and Alitalo, K.: Expression of the *myc* proto-oncogenes in developing human fetal brain. *Oncogene* 5: 1787-1797, 1990.

78. Partanen, J., Mäkelä, T.P., Alitalo, R., Lehtväslaiho, H. and Alitalo, K.: Putative tyrosine kinases expressed in K-562 human leukemia cells. *Proc. Natl. Acad. Sci.* 87: 8913-8917, 1990.

79. Koskinen, P., Sistonen, L., Evan, G., Morimoto, R. and Alitalo, K.: Nuclear colocalization of cellular and viral *myc* proteins with HSP70 in *myc* overexpressing cells. *J. Virol.* 65: 842-851, 1991.

80. Saksela, K., Koskinen, P. and Alitalo, K.: Binding of a nuclear factor to the upstream region of the *c-myc* gene. *Oncogene Res.* 6: 73-76, 1991.

81. Lehtola, L., Sistonen, L., Koskinen, P.J., Lehtväslaiho, H., Di Renzo, M.F., Comoglio, P.M. and Alitalo, K.: Constitutively activated *neu* oncoprotein tyrosine kinase interferes with growth factor-induced signals for gene activation. *J. Cell. Biochem.* 45: 69-81, 1991.

82. Partanen, J., Mäkelä, T., Eerola, E., Korhonen, J., Hirvonen, H., Claesson-Welsh, L. and Alitalo, K.: FGFR-4, a novel acidic fibroblast growth factor receptor with a distinct expression pattern. *EMBO J.* 10: 1347-1354, 1991.

83. Mäkelä, T.P., Saksela, K., Evan, G. and Alitalo, K.: A fusion protein formed by *L-myc* and a novel gene in lung cancer. *EMBO J.* 10: 1331-1335, 1991.

84. Mäkelä, T.P., Kere, J., Winqvist, R. and Alitalo, K.: Intrachromosomal rearrangement fusing *L-myc* and *rif* in small cell lung cancer. *Mol. Cell Biol.* 11: 4015-4021, 1991.

85. Partanen, J., Eerola, E., Bergman, M., Mäkelä, T.P., Hirvonen, H., Huebner, H. and Alitalo, K.: *Cyl* encodes a putative cytoplasmic tyrosine kinase lacking the conserved tyrosine autophosphorylation site (Y416<sup>src</sup>). *Oncogene* 6: 2013-2018, 1991.

86. Wärrä, A.M., Laine, A.M., Majasuo, K.E., Alitalo, K. and Härkönen, P.L.: Enhanced *erbB2* expression in association of growth arrest of ZR 75-1 human breast cancer cells *in vitro* and in nude mice tumors. *Int. J. Cancer*, 49, 616-623, 1991.

87. Armstrong, E., Hästbacka, J., Partanen, J., Huebner, K. and Alitalo, K.: RFPLs in the fibroblast growth factor receptor-4 locus in 5q33-qter. *Nucl. Acids Res.* 19, 5096, 1991.

88. Koskinen, P.J., Sistonen, P., Bravo, R. and Alitalo, K.: Immediate early gene responses of NIH3T3 fibroblasts and NMuMG epithelial cells to TGF $\beta$ . *Growth Factors* 5: 283-293, 1991.

89. Lehtola, L., Nister, M., Hölttä, E., Westermark, B. and Alitalo, K.: Down-regulation of cellular platelet-derived growth factor receptors induced by an activated *neu* receptor tyrosine kinase. *Cell Regul.* 2: 651-661, 1991.

90. Bianchi, N.O., Bianchi, M.S., Alitalo, K. and de la Chapelle, A.: UV damage and repair in the domain of the human *c-myc* oncogene. *DNA and Cell Biol.* 10: 125-132, 1991.

91. Armstrong, E., Partanen, J., Cannizzaro, L., Huebner, K. and Alitalo, K.: Localization of fibroblast growth factor receptor-4 gene to chromosome 5q33-qter. *Genes, Chromos. Cancer*, 4: 94-98, 1992.

92. Saksela, K., Mäkelä, T.P., Hughes, K., Woodgett, J.R. and Alitalo, K.: Activation of PKC increases phosphorylation of the *L-myc* trans-activator domain at a GSK-3 target site. *Oncogene* 7: 347-353, 1992.

93. Mäkelä, T. P., Shiraishi, M., Borrello, M.G., Sekiya, T. and Alitalo, K.: Rearrangement and coamplification of *L-myc* and *rif* in primary lung cancer. *Oncogene* 7: 405-409, 1992.

94. Aprelikova, O., Pajusola, K., Partanen, J., Armstrong, E., Alitalo, R., Bailey, S.K., McMahon, J., Wasmuth, J., Huebner, K. and Alitalo, K.: *FLT4*, a novel class III receptor tyrosine kinase in chromosome 5q33-qter. *Cancer Res.* 52: 746-748, 1992.

95. Partanen J., Armstrong E., Mäkelä T.P., Korhonen J., Sandberg M., Renkonen R., Knuutila S., Huebner K. and Alitalo K.: A novel endothelial cell surface receptor tyrosine kinase with extracellular epidermal growth factor homology domains. *Mol. Cell Biol.* 12: 1698-

1707, 1992.

96. Sekido, Y., Takahashi, T., Mäkelä, T. P., Obata, Y., Ueda, R., Hida, T., Kenja, H., Shimokata, K., Alitalo, K. and Takahashi, T.: Complex intrachromosomal rearrangement in the process of amplification of the *L-myc* gene in small cell lung cancer. *Mol. Cell Biol.* 12: 1747-1754, 1992.
97. Armstrong, E., Cannizzaro, L., Bergman, M., Huebner, K. and Alitalo, K.: The *c-src* tyrosine kinase (CSK) gene, a potential antioncogene localizes to human chromosome region 15q23-q25. *Cytogen. Cell Gen.* 60:119-120, 1992.
98. Mäkelä, T.P., Hellsten, E., Sajantila, A., Alitalo, K. and Peltonen, L.: An Alu variable polyA repeat polymorphism upstream of *L-myc* at 1p32. *Hum. Mol. Gen.* 1: 217, 1992.
99. Korhonen, J., Partanen, J., Armstrong, E. and Alitalo, K. Expression of the *FGFR-4* mRNA in developing mouse tissues. *Int. J. Devel. Biol.* 36: 323-329, 1992.
100. Mäkelä, T.P., Koskinen, P., Västriik, I. and Alitalo, K.: Alternative forms of *Max* as enhancers or suppressors of *myc-ras* cotransformation. *Science* 256: 373-377, 1992.
101. Bergman, M., Mustelin, T., Oetken, C., Partanen, J., Flint, N.A., Amrein, K.E., Autero, M., Burn, P. and Alitalo, K.: The human *p50csk* tyrosine kinase phosphorylates *p56lck* at Tyr-505 and down-regulates its catalytic activity. *EMBO J.* 11: 2919-2924, 1992.
102. Lehtola, L., Partanen, J., Sistonen, L., Korhonen, J., Warri, A., Härkönen, P., Clarke, R. and Alitalo, K.: Analysis of tyrosine kinase mRNAs including four FGF receptor mRNAs expressed in MCF-7 breast-cancer cells. *Int. J. Cancer* 50: 598-603, 1992.
103. Warrington, J.A., Bailey, S.K., Armstrong, E., Aprelikova, O., Alitalo, K., Dolganov, G.M., Wilcox, A., Sikela, J., Wolf, S.F., Lovett, M. and Wasmuth, J.J.: A radiation hybrid map of 18 growth factor, growth factor receptor, hormone receptor or neurotransmitter receptor genes on the distal region of the long arm of chromosome 5. *Genomics* 13: 803-808, 1992.
104. Pajusola, K., Aprelikova, O., Korhonen, J., Kaipainen, A., Pertovaara, L., Alitalo, R. and Alitalo, K.: *FLT4* receptor tyrosine kinase contains seven immunoglobulin-like loops and is expressed in multiple human tissues and cell lines. *Cancer Res.* 52: 5738-5743, 1992.
105. Vainikka, S., Partanen, J., Bellotti, P., Coulier, F., Basilico, C., Jaye, M. and Alitalo, K.: Fibroblast growth factor receptor-4 shows novel features in genomic structure, ligand binding and signal transduction. *EMBO J.* 11: 4273-4280, 1992.
106. Mäkelä T. P., Partanen J., Schwab M. and Alitalo K.: Plasmid pLTRpoly: a versatile high efficiency mammalian expression vector. *Gene* 118: 293-294, 1992.
107. Korhonen, J., Partanen, J., Armstrong, E., Vahtonen, A., Elenius, K., Jalkanen, M. and Alitalo, K.: Enhanced expression of the *tie* receptor tyrosine kinase in endothelial cells during neovascularization. *Blood* 80: 2548-2555, 1992.
108. Pertovaara, L., Tienari, J., Vainikka, S., Partanen, J., Saksela, O., Lehtonen, E. and Alitalo, K.: Modulation of fibroblast growth factor receptor expression and signalling during retinoic acid-induced differentiation of Tera-2 teratocarcinoma cells. *Biochem. Biophys. Res. Commun.* 191: 149-156, 1993.
109. Maglione, D., Guerriero, V., Viglietto, G., Ferraro, M.G., Aprelikova, O., Alitalo, K., Del Vecchio, S., Lei, K.-J., Chou, J.Y. and Persico, M.G.: Two alternative mRNAs coding for the angiogenic factor, placenta growth factor (PIGF), are transcribed from a single gene of chromosome 14. *Oncogene* 8: 925-931, 1993.
110. Pertovaara, L., Saksela, O. and Alitalo, K.: Enhanced bFGF gene expression in response to transforming growth factor  $\beta$  stimulation of AKR-2B cells. *Growth Factors* 9: 81-86, 1993.
111. Mummery, C.L., van Rooyen, Bracke, M., van den Eijnden-van Raaij, J., van Zoelen, E.J. and Alitalo, K.: Fibroblast growth factor-mediated growth regulation and receptor expression in embryonal carcinoma and embryonic stem cells and human germ cell tumours. *Biochem. Biophys. Res. Commun.* 191: 188-195, 1993.
112. Tamagnone, L., Partanen, J., Armstrong, E., Lasota, J., Ohgami, K., Tazunoki, T., LaForgia, S., Huebner, K. and Alitalo, K.: The human *ryk* cDNA sequence predicts a protein containing two putative transmembrane segments and a tyrosine kinase catalytic domain. *Oncogene* 8: 2009-2014, 1993.

113. Armstrong, E., Kastury, K., Pajusola, K., Aprelikova, O., Bullrich, F., Nezelof, C., Gorusev, J., Wasmuth, J.J., Alitalo, K., Morris, S. and Huebner, K.: FLT-4 receptor tyrosine kinase gene: mapping to chromosome 5q35 in relation to the t(2;5), t(5;6) and t(3;5) translocations. *Genes, Chromos. Cancer* 7: 144-151, 1993.
114. Polvi A., Armstrong, E. Lai, G., Lemke, G., Huebner, K., Spritz, R.A., Guida, L.C., Nicholls, R.D. and Alitalo, K.: The human TYRO3 gene and pseudogene are located in chromosome 15q14-q25. *Gene* 134: 289-293, 1993.
115. Klefström, J., Koskinen, P. J., Saksela, E., Jäättelä, M., Bravo, R. and Alitalo, K.: A subset of immediate early mRNAs induced by tumor necrosis factor- $\alpha$  during cellular cytotoxic and non-cytotoxic responses. *Int. J. Cancer* 55: 655-659, 1993.
116. Kaipainen, A., Korhonen, J., Pajusola, K., Aprelikova, O., Persico, M.G., Terman, B.I. and Alitalo, K. The Related FLT4, FLT1 and KDR receptor tyrosine kinases show distinct expression patterns in human fetal endothelial cells. *J. Exp. Med.* 178: 2077-2088, 1993.
117. Pajusola, K., Aprelikova, O., Armstrong, E., Morris, S. and Alitalo, K.: Two human FLT4 receptor tyrosine kinase isoforms with distinct carboxy terminal tails are produced by alternative processing of primary transcripts. *Oncogene* 8: 2931-2937, 1993.
118. Hellsten, E., Vesa, J., Speer, M., Mäkelä, T.P., Järvelä, I., Alitalo, K., Ott, J. and Peltonen, L.: Refined assignment of the infantile neuronal ceroid lipofuscinosis (INCL, CLN1) locus at 1p32: incorporation of linkage disequilibrium in multipoint analysis. *Genomics* 16: 720-725, 1993.
119. Korhonen, J., Polvi, A., Partanen, J. and Alitalo, K. The mouse *tie* receptor tyrosine kinase gene: Expression during embryonic angiogenesis. *Oncogene* 9: 395-403, 1994.
120. Autero, M., Saharinen, J., Pessa-Morikawa, T., Soula-Rothhut, M., Oetken, C., Gassmann, M., Bergman, M., Alitalo, K., Burn, P., Gahmberg, C.G. and Mustelin, T.: Tyrosine phosphorylation of CD45 phosphotyrosine phosphatase by p50<sup>csk</sup> kinase creates a binding site for p56<sup>lck</sup> tyrosine kinase and activates the phosphatase. *Mol. Cell. Biol.* 14: 1308-1321, 1994.
121. Pertovaara, L., Kaipainen, A., Mustonen, T., Orpana, A., Ferrara, N., Saksela, O. and Alitalo, K.: Vascular endothelial growth factor is induced in response to transforming growth factor- $\beta$  in fibroblastic and epithelial cells. *J. Biol. Chem.*, 269: 6271-6274, 1994.
122. Vainikka, S., Joukov, V., Wennström, S., Bergman, M., Pelicci, P.G. and Alitalo, K.: Signal transduction by fibroblast growth factor receptor-4 (FGFR-4): Comparison with FGFR-1. *J. Biol. Chem.* 269: 18320-18326, 1994.
123. Oetken, C., Couture, C., Bergman, M., Bonnefoy-Bérard, N., Williams, S., Alitalo, K., Burn P. and Mustelin, T.: TCR/CD3-triggering causes increased activity of the p50<sup>csk</sup> tyrosine kinase and engagement of its SH2 domain. *Oncogene* 9: 1625-1631, 1994.
124. Philipp, A., Schneider, A., Västrik, I., Finke, K., Xiong, Y., Beach, D., Alitalo, K. and Eilers, M.: Repression of cyclin D1: a novel function of MYC. *Mol. Cell Biol.* 14: 4032-4043, 1994.
125. Koskinen, P., Västrik, I., Mäkelä, T.P., Eisenman, R.N. and Alitalo, K.: Max activity is affected by phosphorylation at two aminoterminal sites. *Cell Growth Differ.* 5: 313-320, 1994.
126. Maclean-Hunter, S., Mäkelä, T., Grzeschizek, A., Alitalo, K. and Möröy, T.: Expression of a RLF/L-myc minigene inhibits differentiation of embryonic stem cells and causes early embryonic lethality in transgenic mice. *Oncogene* 9: 3509-3517, 1994.
127. Tamagnone, L., Lahtinen, I., Mustonen, T., Virtaneva, K., Francis, F., Muscatelli, F., Alitalo, R., Smith, E.C.I., Larsson, C. and Alitalo, K.: *BMX*, a novel nonreceptor tyrosine kinase gene of the *BTX/ITK/TEC/ITK* family located in chromosome Xp22.2. *Oncogene*, 9:3683-3688, 1994.
128. Pajusola K., Aprelikova O., Pelicci G., Weich H., Claesson-Welsh L. and Alitalo K.: Signalling properties of FLT4, a proteolytically processed receptor tyrosine kinase related to two VEGF receptors. *Oncogene* 9: 3545-3555, 1994.
129. Klefström, J., Västrik, I., Saksela, E., Valle, J., Eilers, M. and Alitalo, K.: c-Myc induces cellular susceptibility to the cytotoxic action of TNF- $\alpha$ . *EMBO J.* 13: 5442-5450, 1994.
130. Koegel, M., Kypta, R.M., Bergman, M., Alitalo, K. and Courtneidge, S.A.: Rapid and efficient purification of SH2 domain-containing proteins: FYN, CSK and phosphatidylinositol 3-kinase p85. *Biochem. J.* 302: 737-744, 1994.

131. Kaipainen, A., Vlaykova, T., Hatva, E., Böhlting, T., Jekunen, A., Pyrhönen, S. and Alitalo, K.: Enhanced expression of the *tie* receptor tyrosine kinase messenger RNA in the vascular endothelium of metastatic melanomas. *Cancer Res.* 54: 6571-6577, 1994.
132. Cance, W.G., Craven, Bergman, M., R.J., Xu, L.-H., Alitalo, K. and Liu, E.T.: Rak, a novel nuclear tyrosine kinase, expressed in epithelial cells. *Cell Growth Differ.* 5: 1347-1355, 1994.
133. Laitinen, J., Sistonen, L., Alitalo, K. and Hölttä, E.: Cell Transformation by c-Ha-ras<sup>Val12</sup> oncogene is accompanied by a decrease in histone H1<sup>o</sup> and an increase in nucleosomal repeat length. *J. Cell Biochem.* 57: 1-11, 1995.
134. Hellsten, E., Vesa, J., Speer, M.C., Mäkelä, T.P., Järvelä, I., Alitalo, K., Ott, J. and Peltonen, L.: Refined assignment of the infantile neuronal ceroid lipofuscinosis (INCL, CLN1) locus at 1p32: incorporation of linkage disequilibrium in multipoint analysis. *Genomics* 16: 720-725, 1995.
135. Hatva, E., Kaipainen, A., Jääskeläinen, J., Haltia, M. and Alitalo, K.: Expression of endothelial cell-specific receptor tyrosine kinases and growth factors in human brain tumors. *Am. J. Pathol.* 146: 368-378, 1995.
136. Kaipainen, A., Korhonen, J., Mustonen, T., van Hinsbergh, V.W.M., Fang, G.-H., Dumont, D., Breitman, M. and Alitalo, K.: Expression of the *fms*-like tyrosine kinase 4 gene becomes restricted to lymphatic endothelium during development. *Proc. Natl. Acad. Sci.* 92: 3566-3570, 1995.
137. Bergman, M., Joukov, V., Virtanen, I. and Alitalo, K.: Overexpressed Csk tyrosine kinase is localized in focal adhesions, causes reorganization of  $\alpha\beta 5$  integrin, and interferes with HeLa cell spreading. *Mol. Cell Biol.* 15: 711-722, 1995.
138. Dumont, D.J., Fong, G.-H., Puri, M., Gradwohl, G., Alitalo, K. and Breitman, M.: Vascularization of the mouse embryo: A study of *flk-1*, *tek*, *tie* and VEGF expression during development. *Devel. Dynamics* 203: 80-92, 1995.
139. Väström, I., Kaipainen, A., Penttilä, T.-L., Lymboussakis, A., Alitalo, R., Parvinen, M. and Alitalo, K.: Expression of the *mad* gene during cell differentiation in vivo and its inhibition of cell growth in vitro. *J. Cell Biol.* 128: 1197-1208, 1995.
140. Väström, I., Mäkelä, T.P., Koskinen, P.J. and Alitalo, K.: Determination of sequences responsible for the differential regulation of Myc function by deltaMax and Max. *Oncogene* 11: 553-560, 1995.
141. Ruohola, J.K., Valve, E.M., Vainikka, S., Alitalo, K. and Härkönen, P.L.: Androgen and fibroblast growth factor (FGF) regulation of the FGF receptors in S115 mouse mammary tumor cells. *Endocrinology* 136: 2179-2188, 1995.
142. Korhonen, J., Lahtinen, I., Halmekytö, M., Alhonen, L., Jänne, J., Dumont, D. and Alitalo, K.: Endothelial-specific gene expression directed by the *TIE* gene promoter in vivo. *Blood* 86: 1828-1835, 1995.
143. Hellsten, E., Vesa, J., Heiskanen, M., Mäkelä, T.P., Järvelä, I., Cowell, J.K., Mead, S., Alitalo, K., Palotie, A. and Peltonen, L.: Identification of YAC clones for human chromosome 1p32 and physical mapping of the infantile neuronal ceroid lipofuscinosis (INCL) locus. *Genomics* 25: 404-412, 1995.
144. Puri, M.C., Rossant, J., Alitalo, K., Bernstein, A. and Partanen, J.: The receptor tyrosine kinase Tie is required for the integrity and survival of vascular endothelial cells. *EMBO J.* 14: 5884-5891, 1995.
145. Mäkelä, T.P., Hellsten, E., Vesa, J., Hirvonen, H., Palotie, A., Peltonen, L., Alitalo, K. The rearranged L-myc fusion gene (*RLF*) encodes a Zn-15 related zinc finger protein. *Oncogene* 11: 2699-2704, 1995.
146. Laan, M., Kallioniemi, O.P., Hellsten, E., Alitalo, K., Peltonen, L. and Palotie, A.: Mechanically stretched chromosomes as targets for high resolution FISH mapping. *Genome Res.* 5: 13-20, 1995.
147. Heiskanen, M., Hellsten, E., Kallioniemi, O-P, Mäkelä, T.P., Alitalo, K., Peltonen, L. and Palotie, A.: Visual mapping by fiber-FISH. *Genomics* 30: 31-36, 1995.
148. Batard, P., Sansilvestri, P., Schneinecker, C., Knapp, W., Debili, N., Vainchenker, W., Bühring, H.-J., Monier, M.-N., Kukk, E., Partanen, J., Matikainen, M.-T., Alitalo, R., Hatzfeld, J. and Alitalo, K.: The Tie Receptor Tyrosine Kinase is Expressed by Human Hematopoietic Progenitor Cells and by a Subset of Megakaryocytic Cells. *Blood* 87: 2212-2220, 1996.

149. Joukov, V., Pajusola, K., Kaipainen, D., A., Lahtinen, I., Kukk, E., Saksela, O., Kalkkinen, N. and Alitalo, K.: A novel vascular endothelial growth factor, VEGF-C, is a ligand for the Flt4 (VEGFR-3) and KDR (VEGFR-2) receptor tyrosine kinases. *EMBO J.* 15: 290-298, 1996.
150. Vainikka, S., Joukov, V., Klint, P. and Alitalo, K. Association of a 85 kD Serine Kinase with Activated Fibroblast Growth Factor Receptor-4 (FGFR-4). *J. Biol. Chem.* 271: 1270-1273, 1996.
151. Hatva, E., Böhling, T., Jääskeläinen, J., Persico, M-G., Haltia, M. and Alitalo, K.: Vascular growth factors and receptors in capillary hemangioblastomas and hemangiopericytomas. *Am. J. Pathol.* 148: 763-775, 1996.
152. Olofsson, B.\*, Pajusola, K.\*, Kaipainen, A., von Euler, G., Joukov, V., Saksela, O., Orpana, A., Pettersson, R.F., Alitalo, K.\* and Eriksson, U.\*: Vascular endothelial growth factor B, a novel growth factor for endothelial cells. (\* contributed equally to this work). *Proc. Natl. Acad. Sci.* 93: 2576-2581, 1996.
153. Paavonen, K., Horelli-Kuitunen, N., Chilov, D., Kukk, E., Pennanen, S., Kallioneimi, O.-P., Pajusola, K., Olofsson, B., Eriksson, U., Joukov, V., Palotie, A. and Alitalo, K.: Novel human vascular endothelial growth factor genes VEGF-B and VEGF-C localize to chromosomes 11q13 and 4q34, respectively. *Circulation* 93: 1079-1082, 1996.
154. Böhling, T., Hatva, E., Kujala, M., Claesson-Welsh, L., Alitalo, K. and Haltia, M.: Expression of growth factors and growth factor receptors in capillary hemangioblastoma. *J Neuropathol. Exp. Neurol.* 55: 522-527, 1996.
155. Salvén, P., Joensuu, H., Heikkilä, P., Matikainen, M.-T., Wasenius V-M., Alanko, A. and Alitalo, K.: Endothelial Tie growth factor receptor provides antigenic marker for assessment of breast cancer angiogenesis. *Brit. J. Cancer* 74: 69-72, 1996.
156. Kaukonen, J., Lahtinen, I., Laine, S., Alitalo, K. and Palotie, A.: *BMX* tyrosine kinase gene is expressed in granulocytes and myeloid leukaemias. *Brit. J. Haematol.* 94: 455-460, 1996.
157. Hatva, E., Jääskeläinen, J., Hirvonen, H., Alitalo, K. and Haltia, M.: Tie endothelial cell-specific receptor tyrosine kinase is upregulated in the vasculature of arteriovenous malformations. *J. Neuropathol. Exp. Neurol.* 55: 1124-1133, 1996.
158. Olofsson, B., Pajusola, K., von Euler, G., Chilov, D., Alitalo, K. and Eriksson, U.: Genomic organization of the mouse and human genes for vascular endothelial growth factor B (VEGF-B) and characterization of a second splice isoform. *J. Biol. Chem.* 271: 19310-19317, 1996.
159. Kukk, E., Lymboussaki, A., Taira, S., Kaipainen, A., Jeltsch, M., Joukov, V. and Alitalo, K.: VEGF-C receptor binding and pattern of expression with VEGFR-3 suggests a role in lymphatic vascular development. *Development* 122: 3829-3837, 1996.
160. Joukov, V., Vihinen, M., Vainikka, S., Sodawski, J. M., Alitalo, K. and Bergman, M.: Identification of Csk tyrosine phosphorylation sites and a tyrosine residue important for kinase domain structure. *Biochem. J.* 322: 927-935, 1997.
161. Enholm, B., Paavonen, K., Ristimäki, A., Kumar, V., Gunji, Y., Klefström, J., Kivinen, L., Laiho, M., Olofsson, B., Joukov, V., Eriksson, U. and Alitalo, K.: Comparison of VEGF, VEGF-B, VEGF-C and Ang-1 mRNA regulation by serum, growth factors, oncoproteins and hypoxia. *Oncogene* 14: 2475-2483, 1997.
162. Kukk, E., Wartiovaara, U., Gunji, Y., Kaukonen, J., Bühring, H.-J., Rappold, I., Matikainen, M.-T., Vihko, P., Partanen, J., Palotie, A. and Alitalo, K.: Analysis of Tie receptor tyrosine kinase in haemopoietic progenitor and leukaemia cells. *Brit. J. Haematol.* 98: 195-203, 1997.
163. Rappold, I., Ziegler, B.L., Köhler, I., Marchetto, S., Rosnet, O., Birnbaum, D., Simmons, P.J., Zannettino, A.C.W., Hill, B., Neu, S., Knapp, W., Alitalo, R., Alitalo, K., Ullrich, A., Kanz, L. and Bühring, H.-J.: Functional and phenotypic characterization of cord blood and bone marrow subsets expressing FLT3 (CD135) receptor tyrosine kinase. *Blood* 90: 111-125, 1997.
164. Salvén, P.J., Mäenpää, H.O., Orpana, A.O., Alitalo, K.K. and Joensuu, H.T.: Serum vascular endothelial growth factor is often elevated in disseminated cancer. *Clin. Cancer Res.* 3: 647-651, 1997.
165. Joukov, V., Sorsa, T., Kumar, V., Jeltsch, M., Claesson-Welsh, L., Cao, Y., Saksela, O., Kalkkinen, N. and Alitalo, K.: Proteolytic processing regulates receptor specificity and activity of VEGF-C. *EMBO J.* 16: 3898-3911, 1997.



166. Vuorela, P., Hatva, E., Lymboussaki, A., Kaipainen, K., Joukov, V., Persico, M.G., Alitalo, K. and Halmesmaki, E.: Expression of vascular endothelial growth factor and placenta growth factor in human placenta. *Biol. Reprod.* 56: 489-494, 1997.
167. Monni, O., Joensuu, H., Franssila, K.O., Klefström, J., Alitalo, K. and Knuutila, S.: BCL2 overexpression associated with chromosomal amplification in diffuse large B-Cell lymphoma. *Blood* 90: 1168-1174, 1997.
168. Jeltsch, M., Kaipainen, A., Joukov, V., Meng, X., Lakso, M., Rauvala, H., Swartz, M., Fukumura, D., Rakesh, K.J. and Alitalo, K.: Hyperplasia of lymphatic vessels in VEGF-C transgenic mice. *Science* 276: 1423-1425, 1997.
169. Oh, S.J., Jeltsch, M.M., Birkenhäger, R., McCarthy, J.E.G., Weich, H.A., Christ, B., Alitalo, K. and Witting, J.: VEGF and VEGF-C: Specific induction of angiogenesis and lymphangiogenesis in the differentiated avian chorioallantoic membrane. *Dev. Biol.* 188: 96-109, 1997.
170. Chilov, D., Kukk, E., Taira, S., Jeltsch, M., Kaukonen, J., Palotie, A., Joukov, V. and Alitalo, K.: Genomic organization of human and mouse genes for vascular endothelial growth factor C. *J Biol. Chem.* 272: 25176-25183, 1997.
171. Ekman, N., Lymboussaki, A., Västriik, I., Sarvas, K., Kaipainen, A. and Alitalo, K.: Bmx tyrosine kinase is specifically expressed in the endocardium and the endothelium of large arteries. *Circulation* 96: 1729-1732, 1997.
172. Saharinen, P., Ekman, N., Sarvas, K., Parker, P., Alitalo, K. and Silvennoinen, O.: The Bmx tyrosine kinase induces activation of the Stat signaling pathway, which is specifically inhibited by protein kinase Cδ. *Blood* 11: 4341-4353, 1997.
173. Klefström, J., Arighi, E., Littlewood, T., Jäättelä, M., Saksela, E., Evan G.I. and Alitalo, K.: Induction of TNF-sensitive cellular phenotype by c-Myc involves p53 and impaired NF-κB activation. *EMBO J.* 16: 7382-7392, 1997.
174. Loughna, S., Hardman, P., Landels, E., Jussila, L., Alitalo, K. and Woolf, A.S.: A molecular and genetic analysis of renal glomerular capillary development. *Angiogenesis* 1: 84-101, 1997.
175. Achen, M.G., Jeltsch, M., Kukk, E., Mäkinen, T., Vitali, A., Wilks, A.F., Alitalo, K. and Stacker, S.A.: Vascular endothelial growth factor D (VEGF-D) is a ligand for the tyrosine kinases VEGF receptor-2 (Flk1) and VEGF receptor 3 (Flt4). *Proc. Natl. Acad. Sci* 95: 548-553, 1998.
176. Joukov, V., Kumar, V., Sorsa, T., Arighi, E., Weich, H., Saksela, O. and Alitalo, K.: A recombinant mutant vascular endothelial growth factor-C that has lost vascular endothelial growth factor receptor-2 binding, activation and vascular permeability activities. *J. Biol. Chem.* 273: 6599-6602, 1998.
177. Ristimäki, A., Narko, K., Enholm, B., Joukov, V. and Alitalo, K.: Proinflammatory cytokines regulate expression of the lymphatic endothelial mitogen vascular endothelial growth factor-C. *J. Biol. Chem.* 273: 8413-8418, 1998.
178. Jussila, L., Valtola, R., Partanen, T., Salvén, P., Heikkilä, P., Matikainen, M.-T., Renkonen, R., Kaipainen, A., Detmar, M., Tschachler, E., Alitalo, R. and Alitalo, K.: Lymphatic endothelium and Kaposi's sarcoma spindle cells detected by antibodies against the vascular endothelial growth factor receptor-3. *Cancer Res.* 58: 1599-1604, 1998.
179. Eichmann, A., Corbel, C., Jaffredo, T., Bréant, C., Joukov, V., Kumar, V., Alitalo, K. and le Douarin, N. M.: Avian VEGF-C: cloning, embryonic expression pattern and stimulation of the differentiation of VEGFR2-expressing endothelial cell precursors. *Development* 125: 743-752, 1998.
180. Kinnula, V.L., Aito, H., Alitalo, K., Klefstrom, J. and Raivio, K.O.: Similarities between TNF and exogenous oxidants on the cytotoxic response of c-Myc-expressing fibroblasts in vitro. *Cancer Letters* 125: 191-198, 1998.
181. Gaudenz, K., Roessler, E., Vainikka, S., Alitalo, K. and Muenke, M.: Analysis of patients with various craniosynostosis syndromes for a Pro24Arg mutation in FGFR4. *Mol. Genet. Metab.* 64: 76-79, 1998.
182. Wartiovaara, U., Salvén, P., Mikkola, H., Lassila, R., Kaukonen, J., Joukov, V., Orpana, A., Ristimäki, A., Heikinheimo, M., Joensuu, H., Alitalo, K. and Palotie, A.: Peripheral blood platelets express VEGF-C and VEGF which are released during platelet activation. *Thromb. Haemost.* 80: 171-175, 1998.

183. Salven, P., Lymboussaki, A., Heikkilä, P., Jääskelä-Saari, H., Enholm, B., Aase, K., von Euler, G., Eriksson, U., Alitalo, K. and Joensuu, H.: Vascular endothelial growth factors VEGF-B and VEGF-C are expressed in human tumors. *Am. J. Pathol.* 153: 103-108, 1998.
184. Lymboussaki, A., Partanen, T., Olofsson, B., Thomas-Crusells, J., Fletcher, C.D.M., de Waal, R.M.W., Kaipainen, A. and Alitalo, K.: Expression of the vascular endothelial growth factor C receptor VEGFR-3 in lymphatic endothelium of the skin and in vascular tumors. *Am. J. Pathol.* 153: 395-403, 1998.
185. Kim, J.-O., Nau, M.M., Allikian, K.A., Mäkelä, T.P., Alitalo, K., Johnson, B.E. and Kelley, M.J.: Co-amplification of a novel cyclophilin-like gene (*PPIE*) with *L-myc* in small cell lung cancer cell lines. *Oncogene* 17: 1019-1026, 1998.
186. Vuorela, P., Matikainen, M.-T., Kuusela, P., Ylikorkala, O., Alitalo, K. and Halmesmäki, E.: Endothelial Tie receptor antigen in maternal and cord blood of healthy and preeclamptic subjects. *Obstet. & Gynecol.* 92: 179-182, 1998.
187. Pepper, M. S., Mandriota, S. J., Jeltsch, M., Kumar, V. and Alitalo, K.: Vascular endothelial growth factor (VEGF)-C synergizes with basic fibroblast growth factor and VEGF in the induction of angiogenesis in vitro and alters endothelial cell extracellular proteolytic activity. *J. Cell Physiol.* 177: 439-452, 1998.
188. Olofsson, B., Korpelainen, E., Pepper, M. S., Mandriota, S., Aase, K., Kumar, V., Gunji, Y., Jeltsch, M., Shibuya, M., Alitalo, K. and Eriksson, U.: Vascular endothelial growth factor B (VEGF-B) binds to VEGF receptor-1 and regulates plasminogen activator activity in endothelial cells. *Proc. Natl. Acad. Sci.* 95: 11709-11714, 1998.
189. Cao, Y., Linden, P., Farnebo, J., Cao, R., Eriksson, A., Kumar, V., Qi, J.-H., Claesson-Welsh, L., Alitalo, K.: Vascular endothelial growth factor-C induces angiogenesis *in vivo*. *Proc. Natl. Acad. Sci.* 95: 14389-14394, 1998.
190. Dumont, D.J., Jussila, L., Taipale, J., Lymboussaki, A., Mustonen, T., Pajusola, K., Breitman, M. and Alitalo, K. Cardiovascular failure in mouse embryos deficient in VEGF receptor-3. *Science* 282: 946-949, 1998.
191. Korpelainen, E.I., Karkkainen, M.J., Tenhunen, A., Lakso, M., Rauvala, H., Vierula, M., Parvinen, M. and Alitalo, K.: Overexpression of VEGF in testis and epididymis causes infertility in transgenic mice: Evidence for nonendothelial targets for VEGF. *J. Cell Biol.* 143: 1705-1712, 1998.
192. Vuorela-Vepsäläinen, P., Alfthan, H., Orpana, A., Alitalo, K., Stenman, U.-H. and Halmesmäki, E.: Vascular endothelial growth factor is bound in amniotic fluid and maternal serum. *Human Reprod.* 14: 1346-1351, 1998.
293. Ruohola, J., Valve, E., Kärkkäinen, M., Joukov, V., Alitalo, K. and Härkönen, P.: Vascular Endothelial Growth Factors Are Differentially Regulated by Steroid Hormones and Antiestrogens in Breast Cancer Cells. *Mol. Cell. Endocrinol.* 149: 29-40, 1999.
194. Breiteneder-Geleff, S., Soleiman, A., Kowalski, H., Horvat, R., Amann, G., Kriehuber, E., Diem, K., Weniger, W., Tschachler, E., Alitalo, K. and Kerjaschki, D.: Angiosarcomas express mixed endothelial phenotypes of blood and lymphatic capillaries: podoplanin as a specific marker for lymphatic endothelium. *Am. J. Pathol.* 154: 385-394, 1999.
195. Weninger, W., Partanen, T. A., Breiteneder-Geleff, S., Mayer, C., Kowalski, H., Mildner, M., Pammer, J., Stürzl, M., Kerjaschki, D., Alitalo, K. and Tschachler, E.: Expression of vascular endothelial growth factor receptor-3 and podoplanin suggests a lymphatic endothelial cell origin of Kaposi's sarcoma tumor cells. *Lab. Invest.* 79: 243-251, 1999.
196. Valtola, R., Salven, P., Heikkilä, P., Taipale, J., Joensuu, H., Rehn, M., Pihlajaniemi, T., Weich, H., deWaal, R. and Alitalo, K.: VEGFR-3 and its ligand VEGF-C are associated with angiogenesis in breast cancer. *Am. J. Pathol.* 154: 1381-1390, 1999.
197. Partanen, T., Mäkinen, T., Arola, J., Suda, T., Weich, H. and Alitalo, K.: Endothelial growth factor receptors in human fetal heart. *Circulation* 100: 583-586, 1999.
198. Mäkinen, T., Olofsson, B., Karpanen, T., Hellman, U., Soker, S., Klagsbrun, M., Eriksson, U. and Alitalo, K.: Differential binding of vascular endothelial growth factor B splice and proteolytic isoforms to Neuropilin-1. *J. Biol. Chem.* 274: 21217-21222, 1999.
199. Aase, K., Lymboussaki, A., Kaipainen, A., Olofsson, B., Alitalo, K. and Eriksson, U.: The localization of VEGF-B in the mouse embryo suggests a paracrine role of the growth factor in the developing vasculature in vitro. *Dev. Dynamics* 215: 12-25, 1999.

200. Marchiò, S., Primo, L., Pagano, M., Palestro, G., Albini, A., Veikkola, T., Cascone, I., Alitalo, K. and Bussolino, F.: Vascular endothelial growth factor-C stimulates the migration and proliferation of Kaposi's sarcoma cells. *J. Biol. Chem.* 274: 27617-27622, 1999.
201. Stacker, S.A., Stenvers, K., Caesar, C., Vitali, A., Domagala, T., Nice, E., Roufail, S., Simpson, R.J., Moritz, R., Karpanen, T., Alitalo, K. and Achen, M.G.: Biosynthesis of vascular endothelial growth factor-D involves proteolytic processing which generates non-covalent homodimers. *J. Biol. Chem.* 45: 32127-32136, 1999.
202. Partanen, T., Alitalo, K. and Miettinen, M.: Lack of lymphatic vascular specificity of VEGFR-3: A novel marker for human vascular tumors. *Cancer* 86:2406-2412, 1999.
203. Lymboussaki, A., Olofsson, B., Eriksson, U. and Alitalo, K.: Vascular endothelial growth factor (VEGF) and VEGF-C show overlapping binding sites in embryonic endothelia and distinct sites in differentiated adult endothelia. *Circulation Res.* 85: 992-999, 1999.
204. Iljin, K., Dube, A., Kontusaari, S., Korhonen, J., Lahtinen, I., Oettgen, P. and Alitalo, K.: Role of Ets factors in the activity and endothelial cell specificity of the mouse Tie gene promoter. *FASEB J.* 13: 377-386, 1999.
205. Korpelainen, E. I., Kärkkäinen, M., Gunji, Y., Vikkula, M. and Alitalo, K.: Endothelial receptor tyrosine kinases activate the STAT signaling pathway: mutant Tie-2 causing venous malformations signals a distinct STAT activation response. *Oncogene* 18: 1-8, 1999.
206. Wise, L.M., Veikkola, T., Mercer, A.A., Savory, L.J., Mäkinen, T., Fleming, S.B., Caesar, C., Vitali, A., Mäkinen, T., Alitalo, K. and Stacker, S.A.: Vascular endothelial growth factor (VEGF) -like protein from orf virus NZ2 binds to VEGFR2 and Neuropilin-1. *Proc. Natl. Acad. Sci.* 96: 3071-3076, 1999.
207. Klefstrom, J., Kovanen, P.E., Somersalo, K., Hueber, A.-O., Littlewood, T., Evan, G., Greenberg, A., Saksela, E., Timonen, T. and Alitalo, K.: c-Myc and E1A induced cellular sensitivity to activated NK cells involves cytotoxic granules as death effectors. *Oncogene* 18: 2181-2188, 1999.
208. Dupin, N., Fisher, C., Kellam, P., Ariad, S., Tulliez, M., Franck, N., Van Mark, E., Salmon, D., Gorin, I., Escande, J.-P., Weiss, R.A., Alitalo, K. and Boshoff, C.: Distribution of human herpesvirus-8 latently infected cells in Kaposi's sarcoma, multicentric Castelman's disease, and primary effusion lymphoma. *Proc. Natl. Acad. Sci.* 96: 4546-4551, 1999.

#### Reviews:

1. Vaheri, A., Alitalo, K., Hedman, K., Keski-Oja, J., Kurkinen, M. and Wartiovaara, J.: Fibronectin and the pericellular matrix of normal and transformed adherent cells. *Ann. N.Y. Acad. Sci.* 312: 343-353, 1978.
2. Alitalo, K.: Connective tissue glycoproteins of normal differentiated and of malignant human cells. *Academic Dissertation*, University of Helsinki, Helsinki, Finland, 1980.
3. Vaheri, A., Alitalo, K., Hedman, K., Kurkinen, M., Saksela, O. and Vartio, T.: Fibronectin and its loss in malignant transformation. In: *Biochemistry of Normal and Pathological Connective Tissue*. Colloc. Intern. du C.N.R.S. 287: 249-254, 1980.
4. Kurkinen, M., Alitalo, K., Hedman, K. and Vaheri, A.: Fibronectin, procollagen and the pericellular matrix in normal and transformed fibroblast cultures. In: *Biology of Collagen* (A. Viidik & J. Vuust, eds.), pp. 223-235. Academic Press, New York, 1980.
5. Vaheri, A., Vartio, T., Stenman, S., Saksela, O., Hedman, K. and Alitalo, K.: Fibronectin and proteinases in tumor invasion. In: *Proteinases and Tumor Invasion* (P. Sträuli, A.J. Barrett & A. Baici, eds.), pp. 49-57. Raven Press, New York, 1980.
6. Vaheri, A., Keski-Oja, J., Vartio, T., Alitalo, K., Hedman, K. and Kurkinen, M.: Structure and functions of fibronectin. In: *Gene Families of Collagen and of Other Proteins* (D.J. Prockop & P.C. Champe, eds.), Elsevier/North-Holland, New York, Developments of Biochemistry 15: 161-178, 1980.
7. Vaheri, A. and Alitalo, K.: Pericellular matrix glycoproteins in cell differentiation and in malignant transformation. In: *Cellular Controls in Differentiation* (D. Rees & C. Lloyd, eds.), pp. 29-56. Academic Press, New York, 1981.
8. Alitalo, K. and Vaheri, A.: Pericellular matrix in malignant transformation. *Adv. Cancer Res.* 37: 141-158, 1982.

9. Vaheri, A., Alitalo, K., Hedman, K., Keski-Oja, J. and Vartio, T.: Fibronectin and epithelial cells. In: *Structural Carbohydrates of the Liver*, Falk Symposium No 34: 385-398. MTP Press, Lancaster, 1983.
10. Alitalo, K.: Amplification of cellular oncogenes in cancer cells (a review). *Med. Biol.* 62: 304-317, 1984.
11. Alitalo, K., Saksela, K., Winqvist, R., Schwab, M. and Bishop, J.M.: Amplification and aberrant expression of cellular oncogenes in human colon cancer cells. In: *Genes and Cancer* (J.M. Bishop, M. Graves & J. Rowley, eds.). Alan Liss Inc., New York, pp. 383-397, 1984.
12. Schwab, M., Alitalo, K., Varmus, H.E. and Bishop, J.M.: Amplification of cellular oncogenes in tumor cells. In: *The Cancer Cells*, (G.F. Vande Woude, A.J. Levine, W.C. Topp & J.D. Watson, eds.). Cold Spring Harbor Press, p. 215-220, 1984.
13. Alitalo, K.: Amplification of cellular oncogenes in tumor cells. *Trends Biochem. Sci.* 10: 194-197, 1985.
14. Alitalo, K., Keski-Oja, J., Saksela, K. and Winqvist, R.: Amplification of cellular oncogenes in colon and lung cancer cells. In: *Retroviruses and Human Pathology*, (R.C. Gallo, D. Stehelin & O.E. Varnier, eds.). Humana Press, New York, pp. 485-495, 1985.
15. Oker-Blom, N., Pfeifer-Ohlsson, S., and Alitalo, K.: Retroviruses in neoplasia yesterday, today and tomorrow. In: *Retroviruses and Human Pathology*, (R.C. Gallo, D. Stehelin, & O.E. Varnier, eds.), Humana Press, New York, pp. 1-18, 1985.
16. Alitalo, K. and Schwab, M.: Oncogene amplification in tumor cells. *Adv. Cancer Res.* 47: 235-281, 1985.
17. Alitalo, K., Partanen, P., and Vaheri, A. (eds.): *Synthetic peptides in biology and medicine*. Elsevier Science Publ. 1985.
18. Keski-Oja, J., Alitalo, K., Barlati, S. and Vaheri, A.: Pericellular matrix in fibroblastic and epithelial cells induced by oncogenic transformation. In: *Theories and models in cellular transformation* (L. Santi & L. Zardi, eds.), Academic Press, London, pp. 55-70, 1985.
19. Pohjanpelto, P., Hölttä, E., Jänne, O. and Alitalo, K.: Amplification of ornithine decarboxylase gene in response to polyamine deprivation in CHO cells. In: *Recent progress in polyamine research* (L. Selmeci, M.E. Brosnan, & N. Seiler, eds.), VNU, The Netherlands, pp. 33-47, 1985.
20. Mäkelä, T. and Alitalo, K.: Tyrosine kinases in control of cell growth and transformation. *Med. Biol.* 64: 325-330, 1986.
21. Mäkelä, T.P. and Alitalo, K.: Proto-oncogene amplification: role in tumor progression. In: *Recombinant DNA in Clinical Medicine*, Ann. Clin. Res. 18: 290-296, 1986.
22. Sistonen, L. and Alitalo, K.: Activation of c-ras oncogenes by mutations and amplification. In: *Recombinant DNA in Clinical Medicine*, Ann. Clin. Res. 18: 297-303, 1986.
23. Alitalo, K., Koskinen, P., Mäkelä, T., Saksela, K., Sistonen, L. and Winqvist, R.: myc-oncogenes: activation and amplification. *Biochem. Biophys. Acta Reviews on Cancer* 907: 1-32, 1987.
24. Alitalo, K.: Amplification of cellular oncogenes in cancer cells. In: *Oncogenes and growth factors* (Bradshaw, R. & Prentis, S., eds.), p. 17-23, Elsevier Publications (Cambridge), 1987.)
25. Alitalo, R., Mäkelä, T.P., Alitalo, K., Betsholtz, C. and Andersson, L.C.: PDGF-gene expression in TPA-induced K562, HL-60 and U937 leukemia cells. In: *Recent Advances in Leukemia and Lymphoma* (Gale R.P. & Golde D., eds.), pp. 53-61 Alan R. Liss Inc., N.Y., 1987.
26. Lohi, J., Pertovaara, L., Sistonen, L., Alitalo, K. and Keski-Oja, J.: Regulation by TGF $\beta$  of genes involved in growth control. *Ann. N. Y. Acad. Sci.* 593: 318-320, 1990.
27. Mäkelä, T., Koskinen, P., Saksela, K. and Alitalo, K.: Biochemistry and function of myc oncoproteins analysed with recombinant constructs. In: *Recombinant systems in protein expression* (Alitalo, K., Huhtala, M.-L., Knowles, J. & Vaheri, A., eds.). Elsevier Science Publishers, Amsterdam, The Netherlands, pp. 137-144, 1990.

28. Alitalo, K., Huhtala, M.-L., Knowles, J. and Vaheri, A., editors: *Recombinant systems in protein expression*. Elsevier Science Publishers, Amsterdam, The Netherlands, 1990.
29. Salvén, P. and Alitalo, K.: Genes protecting from cancer (Editorial). *Ann. Med.* 22: 143-144, 1990.
30. Saksela, K., Koskinen, P., Hirvonen, H., Lehtväslaiho, H., Mäkelä, T. and Alitalo, K.: *myc* and *neu* oncogene amplification, overexpression and protein products in human cancer. In: *Growth Regulation and Carcinogenesis* (W.R. Paukovits, ed.), Vol. I, pp.153-174, 1991.
31. Korhonen, J., Partanen, J., Eerola, E., Vainikka, S., Ilvesmäki, V., Voutilainen, R., Julkunen, M., Mäkelä, T. and Alitalo, K.: Novel human FGF receptors with distinct expression patterns. In: *The Fibroblast Growth Factor Family* (A. Baird & M. Klagsbrun, eds.). *Ann. N. Y. Acad. Sci.* 638:403-405, 1991.
32. Mäkelä, T.P., Mattson, K. and Alitalo, K.: Tumor markers and oncogenes in lung cancer. *Eur. J. Cancer* 27: 1323-1327, 1991.
33. Lehtola, L., Lehtväslaiho, H., Koskinen, P. and Alitalo, K.: A chimeric EGFR/*neu* receptor in studies of *neu* function. In *Genes, Oncogenes, and Hormones: Advances in Cellular and Molecular Biology in Breast Cancer* (eds. R.B. Dickson and M.E. Lippman), Kluwer Academic Publishers, pp. 213-228. 1991.
34. Salvén, P., Schwab, M. and Alitalo, K.: Oncogene amplification in human cancer. *Encyclopedia of Human Cancer* 5: 545-550, 1991.
35. Korhonen, J., Partanen, J., Eerola, E., Vainikka, S., Alitalo, K., Mäkelä, T., Sandberg, M., Hirvonen, H. and Alitalo, K.: Five FGF receptors with distinct expression patterns. In: *Angiogenesis* (R. Steiner, P.B. Weisz & R. Langer, eds.), Academic Press, 1992, pp 91-100.
36. Partanen, J., Vainikka, S., Korhonen, J. and Alitalo, K.: Diverse receptors for fibroblast growth factors. *Progr. Growth Factor Res.* 4: 69-83, 1992.
37. Lehtola, L., Lehtväslaiho, H., Koskinen, P. and Alitalo, K.: A chimeric EGFR/*neu* receptor in functional analysis of the *neu* oncoprotein. *Acta Oncol.* 31: 147-150, 1992.
38. Mäkelä, T.P., Saksela, K. and Alitalo, K.: Amplification and rearrangement of L-*myc* in human small-cell lung cancer. *Mutat. Res.* 276: 307-315, 1992.
39. Alitalo, K., Mäkelä, T., Saksela, K., Hirvonen, H. and Koskinen, P.: Oncogene Amplification: Analysis of *myc* Oncoproteins. In *Gene amplification in mammalian cells: Techniques and Applications* (ed. R. Hellems), Marcel Dekker, Inc., pp. 371-382, 1992.
40. Väström, I., Mäkelä, T.P., Koskinen, P. and Alitalo, K.: *myc*, *max*, and a novel *rif-L-myc* fusion protein in small cell lung cancer. In: *Multistage Carcinogenesis*: (eds. C.C. Harris et al.), pp. 307-318, 1992.
41. Alitalo, K.: Molecular analysis of nuclear oncoproteins and receptor tyrosine kinases. In *Academia Scientiarum Fennica: Year Book*, pp. 187-189, 1992.
42. Koskinen, P. and Alitalo, K.: Role of *myc* amplification and overexpression in cell growth, differentiation and death. *Semin. Cancer Biol.* 4: 3-12, 1993.
43. Alitalo, K.: Introduction: Oncogene amplification. *Semin. Cancer Biol.* 4: 1. 1993.
44. Koskinen, P., Mäkelä, T.P., Väström, I. and Alitalo, K.: *myc* Amplification: regulation of Myc function. *Clin. Chim. Acta*, 217: 57-62, 1993.
45. Partanen, J., Vainikka, S. and Alitalo, K.: Structural and functional specificity of FGF receptors. In: *Phil. Trans. R. Soc. Lond.*, Series B 340: 297-303, 1993.
46. Alitalo, K., Mäkelä, T.P., Saksela, K., Koskinen, P.J. and Hirvonen, H.: Oncogene Amplification: Analysis of *myc* oncoproteins. In: *Gene Amplification in Mammalian Cells* (Ed. R.E. Hellems). Marcel Dekker, Inc., pp. 371-382, 1993.

47. Västrik, I., Mäkelä, T.P., Koskinen, P.J., Klefström, J. and Alitalo, K.: *Myc* protein, partners and antagonists. *Crit. Rev. Oncogenesis* 5: 59-68, 1994.
48. Partanen, J., Lahtinen, I. and Alitalo, K.: Tie protein-tyrosine kinase. In: *The Protein Kinase Factsbook* (eds. D.G.Hardie and S. Hanks), Academic Press, 1995, pp. 152-153.
49. Pajusola, K., Kaipainen A. and Alitalo, K.: Flt-4 receptor PTK. In: *The Protein Kinase Factsbook* (eds. D.G. Hardie and S. Hanks), Academic Press, 1995, pp. 168-169.
50. Vainikka S., Mustonen T. and Alitalo K.: Fibroblast growth factors. In: *Guidebook to Cytokines and their receptors*. (N.A. Nicola, ed.) Oxford University Press 1995, pp 214-218.
51. Mustonen, T. and Alitalo, K.: Endothelial receptor tyrosine kinases involved in angiogenesis. *J. Cell Biol.* 129: 895-898, 1995.
52. Klefström, J., Saksela, E. and Alitalo, K.: Molecular mechanisms controlling susceptibility to tumor necrosis factor induced cell death. In: *Tumor Biology Regulation of Cell Growth, Differentiation and Genetics in Cancer* (Eds. Asterios S. Tsiftoglou et al.), NATO ASI Series, Series H: Cell Biology, Vol 99, Springer Verlag pp.143-154, 1996.
53. Joukov, V., Kaipainen, A., Jeltsch, M., Pajusola, K., Olofsson, B., Kumar, V., Eriksson, U. and Alitalo, K.: Vascular endothelial growth factors VEGF-B and VEGF-C. *J. Cell Physiol.* 173: 211-215, 1997.
54. Böhling, T., Hatva, E., Plate, K.H., Haltia, M. and Alitalo, K.: Von Hippel-Lindau disease and capillary haemangioblastoma. In: *Pathology & Genetics. Tumours of the Nervous System*, (Eds. Kleihues, P. and Cawenee, W.K.), International Agency for Research on Cancer, WHO, chapter 14, pp. 179-181, 1997.
55. Korpelainen, E. and Alitalo, K.: Signaling angiogenesis and lymphangiogenesis. *Current Opinion in Cell Biology* 10: 159-164, 1998.
56. Enholm, B., Jussila, L., Kärkkäinen, M. and Alitalo, K.: Vascular endothelial growth factor-C, a growth factor for lymphatic endothelial cells. *Trends in Cardiovascular Med.* Vol. 8, No. 7, 292-297, 1998.
57. Laurén, J., Gunji, Y. and Alitalo, K.: Is angiopoietin-2 necessary for the initiation of tumor angiogenesis? *Am. J. Pathol.* 153: 1333-1339, 1998.
58. Taipale, J., Makinen, T., Arighi, E., Kukk, E. and Alitalo, K.: Vascular endothelial growth factor receptor-3. In: *Curr. Topics Microbiol. Immunol.* (Ed. Lena Claesson-Welsh), 237: 85-96, 1999.
59. Eriksson, U. and Alitalo, K.: Structure, expression and reseptor-binding properties of novel vascular endothelial growth factors. In: *Current Topics in Microbiology and Immunology*. (Ed. Lena Claesson-Welsh), Springer Verlag, GmbH & Co, KG 237: 41-57, 1999.
60. Veikkola, T. and Alitalo, K.: VEGFs, receptors and angiogenesis. *Semin. Cancer Biol.* 9: 211-220, 1999.
61. Olofsson, B., Jeltsch, M., Eriksson, U. and Alitalo, K.: Current biology of VEGF B and VEGF-C. *Pharmaceutical Biotechnology* 10:528-535, 1999.
62. Petrova, T.V., Makinen, T., Alitalo, K.: Signaling via vascular endothelial growth factor receptors. *Exp. Cell Res.* 253:117-130, 1999.
63. Kaipainen, A., Kukk, E., Enholm, B., Hietanen, K., Gunji, Y. and Alitalo, K.: III Angiogenic Factors: Tie receptors, Ang ligands. In: *Tumor Angiogenesis and Microcirculation*. (Eds. D'Amore P., Voest E., Noren T., Casella C.), Marcel Dekker, Inc., in press.
64. Kaipainen, A., Korpelainen, E., Karkkainen, M., Veikkola, T. and Alitalo, K.: Vascular endothelial growth factor receptors. In: *Tumor Angiogenesis and Microcirculation*. (Eds. D'Amore P., Voest E., Noren T., Casella C.), Marcel Dekker, Inc., in press.
65. Alitalo, K., Gunji, Y., Alitalo, R. and Eichmann, A.: VEGF receptors in vascular development and hematopoiesis. In: *Developmental Biology of Hematopoiesis*. (Ed. Leonard I. Zon), in press.
66. Veikkola, T., Karkkainen, M., Claesson-Welsh, L. and Alitalo, K.: Regulation of Angiogenesis via Vascular Endothelial Growth Factor Receptors. *Cancer Res.*, in press.

67. Ferrara, N. and Alitalo, K.: Clinical applications of angiogenic growth factors and their inhibitors. *Nature Med.* 5: 1359-1364, 1999.

**Publications in Finnish:**

1. Alitalo, K., Saksela, O. and Vaheri, A.: Sidekudos ja maligni solu (Connective tissue and malignant cells, a review in Finnish). *Duodecim* 96: 1572-1783, 1980.
2. Vaheri, A. and Alitalo, K.: Retrovirukset ja ihmisen syöpägeenit (Retroviruses and human oncogenes). *Duodecim* 99: 452-457, 1983.
3. Alitalo, K., and Vaheri, A.: Syöpägeenit (Oncogenes). *Duodecim* 99: 1383-1399, 1983.
4. Keski-Oja, J. and Alitalo, K.: Verihiutalekasvutekijä (PDGF) - onkogeenin tuote. (Platelet-derived growth factor - product of an oncogene). *Duodecim* 99: 1243-1246, 1983.
5. Alitalo, K. and Vaheri, A.: Syövän synty geeneissä. (The origin of cancer in genes). *Tiede 2000* (Science 2000) 9: 50-55, 1983.
6. Alitalo, K. and Keski-Oja, J.: Erythroblastosionkogeeni on osa kasvutekijäreseptorin geeniä. (Erythroblastosis oncogene - part of a growth factor gene). *Duodecim* 100: 460-461, 1984.
7. Alitalo, K.: Syöpägeenit. (Oncogenes). In: *"Syövän Biologia"* (Cancer Biology) (K. Alitalo, L. Andersson, L. Teppo, & A. Vaheri, eds.) pp. 103-115, WSOY, 1985.
8. Alitalo, K. and Vaheri, A.: Syöpäsolun ilmiäsu (The phenotype of cancer cells). In: *Syövän Biologia* (Cancer Biology) (K. Alitalo, L. Andersson, L. Teppo & A. Vaheri, eds.) pp. 157-172, WSOY, 1985.
9. Vaheri, A., and Alitalo, K.: Virukset syövän aiheuttajina (Viruses as causes of cancer) In: *Syövän Biologia* (Cancer Biology) (K. Alitalo, L. Andersson, L. Teppo, & A. Vaheri, eds.) pp. 135-144, WSOY, 1985.
10. Alitalo, K., Andersson, K., Teppo, L., and Vaheri, A. (eds.). *Syövän Biologia* (Cancer Biology) WSOY, 1985.
11. Aho, M., Alitalo, K. and Syrjänen, K.: Syylistä syöpään. (From Papilloma to Carcinoma. An editorial in Finnish). *Suomen Lääkärilehti* (The Finnish Medical Journal) 24: 2242, 1985.
12. Alitalo, K. and Keski-Oja, J.: Uusi autokriininen syövän syntymekanismi (A novel autocrine mechanism of tumorigenesis). *Duodecim* 101: 1543-1546, 1985.
13. Keski-Oja, J., Laiho, M. and Alitalo, K.: Kasvutekijät ja syöpä. (Growth factors and cancer) *Tiede 2000* (Science 2000) 1: 18-21, 1986.
14. Saksela, K., Mäkelä, T. and Alitalo, K.: Keuhkosyövän molekyylibiologiaa. (On the molecular biology of lung cancer). *Suomen Lääkärilehti* (The Finnish Medical Journal) 18: 1712-1718, 1986.
15. Alitalo, K.: Syöpägeenit. (Oncogenes). *Otavan Suuri Ensyklopedia* 9842-9844, 1986.
16. Keski-Oja, J. and Alitalo, K.: Transformoiva kasvutekijä- $\beta$  ja maligni kasvu. (Transforming growth factor $\beta$  and malignant growth). *Duodecim* 102: 1015-1023, 1986.
17. Saksela, O. and Alitalo, K.: Angiogeeninen onkogeeni. (An angiogenic oncogene). *Duodecim* 104: 67, 1987.
18. Lehtola, L. and Alitalo, K.: Onkogeenien kliininen merkitys. (The clinical significance of oncogenes). *Duodecim* 104: 1847-1863, 1988.
19. Winqvist, R., Krusius, T. and Alitalo, K.: Syöpälääkeresistenssin molekulaariset mekanismit. (The molecular mechanisms of drug resistance). *Duodecim* 105: 1707-1714, 1989.
20. Alitalo, K.: Lääketieteen Nobelin palkinto soluonkogeenien löytäjille. (The discoverers of cellular oncogenes receive the Nobel Prize). *Duodecim* 105: 1887-1891, 1989.
21. Saksela, K. and Alitalo, K.: Mitä onkogeenit ovat ja miksi niitä tutkitaan? (What are oncogenes and why are they being studied).

*Suomen Lääkärilehti* (The Finnish Medical Journal) 44: 1567-1570, 1989.

22. Lehtonen, E. and Alitalo, K.: A course on transgenic mice. *Opetusmoniste* Helsinki University Press, 1989.

23. Lehväslaiho, H., Mäkelä, T. and Alitalo, K.: Proto-onkogeinit ja solujen kasvun säätely. (Proto-oncogenes and cell growth control). *Duodecim* 106: 261-277, 1990.

24. Alitalo, K. and Petterson, R.: Geenien kohdennettu muuntelu - perustutkimuksen uusin täsmäase. (Targeted mutagenesis - a new tool of basic research). *Duodecim* 106: 343-346, 1990.

25. Markkula, M., Alitalo, K. and Lehtonen, E.: Geeni siirtyy, tieto kasvaa. (Gene transfer - for growth of knowledge). *Tiede* 2000 (Science 2000) 4: 46-49, 1990.

26. Alitalo, K.: Lääketieteen ja fysiologian Nobelin palkinto molekyylibiologiselle syöpätutkimukselle. (The Nobel Prize in medicine for molecular cancer research). *Kemia-Kemi* 17: 226-230, 1990.

27. Alitalo, K.: Molekyyli tutkimus iskee ytimeen. (Molecular biology hits the bone marrow). *Duodecim* 106: 1631-1632, 1990.

28. Alitalo, K.: Kataja perintö. (A bad inheritance). *Duodecim* 107: 132-133, 1991.

29. Korhonen J., Eerola E. and Alitalo K.: Onkogeinit ja tuumorisuppressorigeenit solun kasvun säätelijöinä. (Oncogenes and tumor suppressor genes as regulators of cell growth) *Solubiologi* 2: 127-134, 1991.

30. Lehtola, L. ja Alitalo, K.: Rintasyövän ennusteen arviointi. (Prognosis of breast cancer) *Duodecim* 107: 903-905, 1991.

31. Laiho, M. ja Alitalo, K.: Kasvurajoitegeenien muutokset syövän syntymekanismina. (Suppressor genes in tumorigenesis) *Duodecim* 107: 1680-1691, 1991.

32. Klefström, J., Saksela, E. and Alitalo, K.: Tuumorinekroositekijä ja solutapon monimutkainen laukaisumekanismi. (Tumor necrosis factor and the complicated triggering of cell death) *Duodecim* 108: 1449-1455, 1992.

33. Paloheimo, M., Saksela, O., Pyrhönen, S. and Alitalo, K.: Melanooman kasvun säätely. (Growth control in melanomas) *Duodecim* 108: 2097-2104, 1992.

34. Alitalo, K. and Pettersson, R.: Syövän synnyn molekyyli geneettiset ja -biologiset mekanismit. (The molecular genetic and molecular biologic causes of cancer) *Duodecim* 109: 809-813, 1993.

35. Silvennoinen, O., Julkunen, I. ja Alitalo, K.: Interferonien kuuma linja tumaan. (Interferon hot line to the nucleus) *Duodecim* 109: 1447-1449, 1993.

36. Winqvist, R. ja Alitalo, K.: Periytyvän rintasyöpäalttiuden riskigeenit selviämässä. (Revealing breast cancer susceptibility genes) *Duodecim* 111: 113-115, 1995.

37. Alitalo, K.: Geenit ja syöpä (Genes and cancer). In: *Tutkimuksen etulinjassa/Tieteen päivät 1995* (Science days-1995), 225-231, 1995, WSOY.

38. Alitalo, K.: Endoteelin kasvutekijä- ja reseptorigeenit. *Duodecim* 112: 341-344, 1996.

39. Jussila, L., Alitalo, K. ja Kaipainen, A.: Uutta imua lymfasuoniston biologiaan. *Duodecim* 114: 343-348, 1998.

40. Alitalo, K.: Onkogeeneistä syövän molekyylibiologiaan ja angiogeneesiin estoon (Matti Äyräpään luento) *Duodecim* 114: 2545-2553, 1998.

41. Alitalo, K.: Uusi geenitekniikka syöpätutkimuksessa. (New gene technology in cancer research) *Geeni- ja biotekniikka*, Otava, in press.

#### Patents



## Kari Alitalo, CV and publications

United States Patent 5,607,918 Eriksson, et. al. Mar. 4, 1997 Vascuarendothelial growth factor-B and DNA coding therefor Inventors: Eriksson;Wlf (B.ang.lsta, SE); Olofsson;Birgitta (Sundbyberg, SE); Alitalo; Kari (Helsinki, FI); Pajusola; Katri (Helsinki, FI). Assignee: Ludwig Institute for Cancer Research (New York, NY); Helsinki University Licensing Ltd. Oy (University of Helsinki, FI). Appl. No.: Filed: Jun. 6, 1995

United States Patent 5,776,755 Alitalo, et. al. Jul. 7, 1998 FLT4, a receptor tyrosine kinase Inventors: Alitalo; Kari (Espoo, FI); Aprelikova; Olga (Helsinki, FI); Pajusola; Katri (Helsinki, FI); Armstrong; Elina (Helsinki, FI); Korhonen; Jaana (Helsinki, FI); Kaipainen; Arja (Helsinki, FI). Assignee: Helsinki University Licensing, Ltd. (Helsinki, FI). Filed: Nov. 14, 1994